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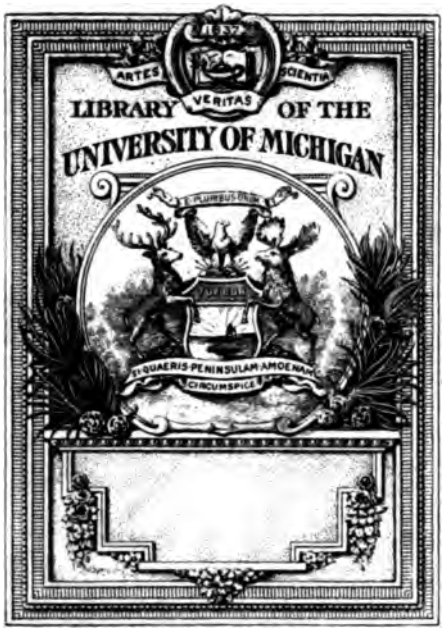
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FOR THE

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REPORT OF THE PHILIPPINE COMMISSION.

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2. Department of the Colorado.

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2. Department of the Columbia.

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Military Academy—
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1. Chickamauga and Chattanooga.
2. Gettysburg.
3. Shiloh.
4. Vicksburg.

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1. Board of Commissioners.
2. Inspection of.

Inspection of National Home for Disabled Volunteer Soldiers.

Volumes V-IX.....Chief of Engineers.

Volume X.....Chief of Ordnance.

Volumes XI-XIV....The Chief of the Bureau of Insular Affairs, the Philippine Commission, and Acts of the Philippine Commission.

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CONTENTS.

PART I.

	Page.
Annual report of the Philippine Commission	3
Conditions as to peace and order	3
The Moro Province	7
Use of constabulary in connection with scouts	16
Friar-land purchases	18
Religious controversies	21
Currency	22
The Philippine tariff	27
The Dingley tariff	28
Refundable export duties	28
Mining law	29
Public lands	30
Extradition laws	30
Recommendations	31
Report of the civil governor of the Philippine Islands	35
Provincial and municipal governments	35
Provincial and municipal elections	36
City of Manila	37
Manila Harbor improvement	38
Pasig River improvement	40
Philippine civil-service board	40
Insular purchasing agent	44
Office management	48
Executive bureau	48
Exhibit A.—Report of the municipal board of the city of Manila for the fiscal year ending June 30, 1904	51
Report of the secretary of the board	80
Report of the disbursing officer	83
Report of the fire department	91
Report of the department of engineering and public works	107
Report of the chief of police	192
Report of the law department	204
Report of the city assessor and collector	211
Exhibit A.—Assessed valuation of taxable real estate, city of Manila, 1903	226
Exhibit B.—Assessed valuation of taxable real estate, city of Manila, 1904	226
Exhibit C.—Statement of properties exempt from taxation in the city of Manila, June 30, 1904	226
Exhibit D.—Statement of market receipts and expenses, fiscal year 1903–4	242
Exhibit E.—Annual statement of receipts and disbursements	244

Report of the civil governor of the Philippine Islands—Continued. Page.
Executive bureau—Continued.
Exhibit B.—Report of the officer in charge of the improvement of the port of Manila 247
Exhibit C.—Report of the Philippine civil-service board 251
Exhibit D.—Report of the insular purchasing agent 269
Disbursing division 272
Property division 291
Record division 300
Local purchasing agent, land transportation division 307
Exhibit E.—Report of the executive secretary 312
Appendix A.—Draft of rules to be observed in preparing, coursing, and recording official correspondence 337
Appendix B.—See Appendix K.
Appendix C.—Report of law clerk 340
Appendix D.—Report of the chief of the translation division 344
Appendix E.—The government of the Philippine Islands 345
Appendix F.—Administration and finance division 350
Appendix G.—Records division 352
Appendix H.—Report of the chief of the document division 352
Appendix I.—Report of the acting disbursing officer 355
Appendix J.—Brief biography of the members of the honorary board of Filipino commissioners to the Louisiana Purchase Exposition 356
Appendix K.—Reports of provincial governors 360
Province of—
Abra 360
Albay 365
Ambos Camarines 389
Antique 398
Bataan 401
Batangas 404
Benguet 410
Bohol 412
Bulacan 420
Cagayan 431
Capiz 437
Cavite 445
Cebu 466
Ilocos Norte 483
Ilocos Sur 493
Iloilo 498
Isabela 506
Laguna, La 511
Lepanto-Bontoc 519
Leyte 530
Masbate 537
Mindoro 539
Misamis 545
Negros Occidental 549
Negros Oriental 557
Nueva Ecija 565
Nueva Viscaya 571
Pampanga 577

Report of the civil governor of the Philippine Islands—Continued. Page.
Executive bureau—Continued.
Exhibit E.—Report of the executive secretary—Continued.
Appendix K.--Reports of provincial governors—Cont'd.
Province of—Continued.
Pangasinan ---- 582
Paragua ---- 585
Rizal ---- 587
Romblon ---- 599
Samar ---- 603
Sorsogon ---- 612
Surigao ---- 625
Tarlac ---- 632
Tayabas ---- 635
Union, La ---- 650
Zambales ---- 664
Exhibit F.—Executive orders and proclamations, October 1, 1903, to September 30, 1904 ---- 685
Exhibit G.—Operations under the Congressional relief fund ---- 719
Exhibit H.—Report on friar lands surveys by the consulting engineer to the Commission ---- 747
Exhibit I.—Report on examinations to titles to friars' estates ---- 752

PART II.

Report of the secretary of the interior ---- 1
Organization of the department ---- 3
Operations of the department facilitated by the state of public order ---- 3
Board of health for the Philippine Islands and the city of Manila ---- 4–22
General health conditions ---- 4
Vital statistics ---- 5
Need of public bath houses and laundries ---- 6
Esteros and tidal creeks ---- 6
Lowlands ---- 7
Mosquitoes ---- 7
Leper colony ---- 8
Smallpox and vaccinations ---- 10
Asiatic cholera ---- 11
Bubonic plague ---- 11
Health work in the city of Manila ---- 12
Sanitary work in the provinces ---- 14
Collection and disposal of night soil ---- 15
Division of disinfectors ---- 15
Overcrowding ---- 16
Markets, tiendas, and food inspection ---- 16
Opium-smoking establishments ---- 16
Free dispensaries and free clinics ---- 16
Hospitals for the insane ---- 17
General hospital ---- 17
The San Lazaro hospitals ---- 18
San Juan de Dios Hospital ---- 18
Municipal physicians and midwives ---- 19
Boards of medical and surgical, pharmaceutical, and dental examiners ---- 19
Enforcement of sanitary laws ---- 19

Report of the secretary of the interior—Continued. Page.
Board of health for the Philippine Islands in the city of Manila—Continued.
Bilibid prison ---- 20
Work of the veterinary division ---- 20
Office of the commissioner of public health ---- 21
Quarantine service ---- 22–24
Vessels boarded ---- 22
Bubonic plague ---- 23
Smallpox ---- 23
Leprosy ---- 23
Aid to other services ---- 23
Quarantine station at Cebu ---- 23
Additional launch ---- 24
Interisland quarantine service ---- 24
Philippine civil hospital ---- 24–26
Training of Filipino nurses ---- 26
Maternity ward ---- 26
Civil sanitarium, Baguio, Benguet ---- 26–31
Attendance ---- 27
Diseases at Baguio ---- 28
Weather ---- 30
New hospital buildings recommended ---- 30
Stable ---- 30
Superintendent authorized ---- 31
Bureau of forestry ---- 31
Exhibit at the Louisiana Purchase Exposition ---- 31
New quarters ---- 32
Additional employees ---- 32
Collections of forest products ---- 32
Division of forest management ---- 32
Licenses ---- 32
Lamao forest reserve ---- 33
Timber-testing laboratory and workshop ---- 34
Mining bureau ---- 35
Assay work transferred ---- 36
Administration of mining grants transferred ---- 36
New quarters needed for the bureau ---- 37
Additions to collections ---- 37
Active field work begun ---- 38
Future fieldwork ---- 39
Present status of mining ---- 39
Mining labor ---- 42
Necessity for amendment to congressional legislation ---- 42
Minerals of the Philippines ---- 43
Bureau of government laboratories ---- 44
New building ---- 44
Visiting scientists ---- 45
Possible outside assistance ---- 45
Library ---- 46
Office of the superintendent ---- 47
Serum laboratory ---- 48
Botanical work ---- 50
Biological laboratory ---- 50

Report of the secretary of the interior—Continued. Page.
Bureau of government laboratories—Continued.
Entomological work ---- 51
Chemical work ---- 52
Research on cocoanuts ---- 53
Division of weights and measures ---- 54
Difficulties due to cost of living ---- 54
Publications ---- 55
Clinical work ---- 55
Work of government photographer ---- 55
Income from private work ---- 55
Value of work performed for other bureaus ---- 57
Bureau of public lands ---- 58
New legislation ---- 58
Work of the chief of bureau ---- 58
Administration of Spanish mining grants transferred ---- 59
Necessity for a system of land surveys ---- 59
Record of Spanish land titles ---- 59
San Lazaro estate ---- 59
Friar lands ---- 60
Special work performed by the chief ---- 60
Bureau of agriculture ---- 60
Establishment of a dairy farm ---- 61
Other animals received ---- 63
Horses and jacks ---- 63
Proposed breeding station for horses ---- 63
Jersey cattle ---- 64
Hogs ---- 64
Pure-bred fowls and crosses ---- 64
Beef bulls ---- 65
Stock farm at Culion ---- 65
Fodder on government farms ---- 65
Singalong experiment station, Manila ---- 66
Seed and plant distribution ---- 67
Batangas station ---- 67
Coffee plantation at Lipa, Batangas ---- 68
Experiments at Baguio and Trinidad, Benguet ---- 68
Rice farm at Murcia, Tarlac ---- 69
San Ramon farm, Mindanao ---- 70
Agricultural college and experiment station at La Carlota ---- 72
Fiber investigation ---- 72
Cocoanut oil products ---- 73
Other investigations ---- 73
Indian corn ---- 73
The castor bean ---- 74
Sheep and wool ---- 74
Publications ---- 74
Philippine weather bureau ---- 74
Improvement in offices ---- 75
Work of the bureau ---- 75
Weather stations ---- 76
Exhibit at the Louisiana Purchase Exposition ---- 76
Ethnological survey for the Philippine Islands ---- 76
Work of Doctor Miller ---- 77

Report of the secretary of the interior—Continued. Page.
Ethnological survey for the Philippine Islands—Continued.
Work of Mr. Reed 78
Work of Mr. Christie 78
Publications 78
Ethnological and commercial museum 79
Need of museum building 80
Appendix A.—Report of the commissioner of public health 83
Report of the chief health inspector for the Philippine Islands 170
Report of the physician in charge of San Lazaro Hospital 188
Report of the sanitary engineer for the Philippine Islands 196
Report of the disbursing officer, bureau of public health 202
Report of cashier of board of health 202
Report of the chief of the veterinary division 204
A preliminary report on the presence of anthrax in the Philippine Islands 207
Special report on swine plague and hog cholera 210
Special report on Texas fever (tick fever, Spanish fever) 212
Clinical notes on surra 215
Report of medical superintendent, Chinese hospital for contagious diseases 216
Special report on Bilibid prison 217
Report of the Cebu leper hospital 218
Report of the Palestina leper hospital 219
Report of special sanitary inspection of the province of Albay 219
Report of special sanitary inspection of the province of Bataan 219
Report of special sanitary inspection of the province of Cavite 222
Special report on sanitary work in the city of Cebu 231
Report of special sanitary inspection of the province of Misamis 236
Special report on Pampanga Province 241
Report of special sanitary inspection in the provinces of Pampanga, Tarlac, Pangasinan, Benguet, and Union 248
Report of special sanitary inspection of the provinces of Surigao, Leyte, and Samar 259
Report of the president of the provincial board of health of Surigao 264
Report of special sanitary inspection of the province of Zambales 266
Appendix B.—Report of the board of medical examiners 270
Appendix C.—Report of the board of pharmaceutical examiners 274
Appendix D.—Report of the board of dental examiners 275
Appendix E.—Report of chief quarantine officer for the Philippine Islands 277
Appendix F.—Report of the attending physician and surgeon, Philippine Civil Hospital 302
Appendix G.—Report of the attending physician and surgeon, civil sanitarium, Baguio, Benguet 308
Appendix H.—Report of chief of the bureau of forestry 328
Appendix I.—Report of the mining bureau 379
Appendix J.—Report of the superintendent of government laboratories 411
Report of the librarian, bureau of government laboratories 426
Report of Dr. Richard P. Strong, director of the biological laboratory 435
Report of the chemical laboratory 444
Report of the director of the serum laboratory 449

Report of the secretary of the interior—Continued. Page.
Appendix J.—Report of the superintendent of government laboratories—Continued.
Report of the botanist ... 461
Report of the photographer ... 465
Appendix K.—Report of the chief of the bureau of public lands ... 468
Appendix L.—Report of the chief of the bureau of agriculture ... 480
Exhibit A.—Report on government stock farm on Culion Island ... 505
Exhibit B.—Report on the distribution of seeds ... 509
Exhibit C.—Report of superintendent of government rice farm ... 511
Exhibit D.—Report on thrashing of palay ... 513
Exhibit E.—Report of superintendent of San Ramon farm ... 514
Exhibit F.—Report of agricultural college and experiment station ... 516
Exhibit G.—Report of soil physicist ... 521
Exhibit H.—Report of fiber expert ... 531
Exhibit I.—Report on cocoanut industry ... 538
Appendix M.—Report of the director of the Philippine weather bureau ... 542
Appendix N.—Report of the acting chief of the ethnological survey ... 561
Report of the governor of Moro Province ... 572
Acts of the legislative council of Moro Province:
No. 19. An act appropriating the sum of 65,158 pesos, in Philippines currency, or so much thereof as may be necessary, in part compensation for the fiscal year 1904, and for other purposes ... 595
No. 20. An act to provide for the allowance of traveling expenses and subsistence expenses of provincial and district officials and employees, and to repeal section 3 of act No. 17 ... 598
No. 21. An act providing for the establishment of the municipalities of Mati, Davao, Makar, Cotabato, Malabang, Dapitan, Cateel, Baganga, and Caraga, and enlarging the municipalities of Iligan and Zamboanga ... 598
No. 22. An act to provide for the employment of a clerk in the office of the district governor of Davao, and fixing the salary of the district secretary of the district of Davao ... 600
No. 23. An act to provide for the employment of certain subordinate employees in the office of the district governor of the district of Cotabato, and fixing the salaries thereof, and fixing the salary of the district secretary of said district ... 600
No. 24. An act to provide for the employment of one clerk, class 9, in addition to those provided for in act No. 12, in the office of the provincial engineer, and fixing the salary thereof ... 600
No. 25. An act to provide for the organization of the office of the district governor, district of Lanao, to provide salaries for the employees thereof, and to fix the salary of the secretary of said district ... 601
No. 26. An act appropriating the sum of 15,237 pesos and 12 centavos, Philippines currency, or so much thereof as may be necessary, to pay various expenses of the government of the Moro Province for the first and second quarters of the fiscal year 1904, not provided for in the general appropriation acts for the first and second quarters ... 601
No. 27. An act regulating the sale of intoxicating liquors, and repealing act No. 709 of the Philippine Commission in its application to the Moro Province ... 604

Report of the governor of Moro Province—Continued. Page.
Acts of the legislative council of Moro Province—Continued.
No. 28. An act appropriating the sum of 1,080 pesos and 10 centavos, Philippines currency, or so much thereof as may be necessary, to defray the current expenses of the town of Jolo, district of Sulu, for the months of November and December, 1903. 607
No. 29. An act to provide that the Moro Province shall be the beneficiary of the collections derived for timber cut and forestry products on government lands returned to the province by the insular government 607
No. 30. An act extending the time for the payment of the cedula tax for the year 1903 in the districts of Cotabato, Lanao, and Davao, and the subdistrict of Dapitan 607
No. 31. An act to amend Act No. 1 of the legislative council of the Moro Province, entitled "An act to provide for the employment of certain subordinate employees in the office of the treasurer of the Moro Province;" Act No. 3, entitled "An act to provide for the organization of the office of district treasurer of the district of Zamboanga, and fixing the salaries of the employees thereof;" Act No. 7, entitled "An act to provide for the organization of the offices of the district treasurers of the districts of Cotabato, Sulu, Davao, and Lanao, and fixing the salaries of the employees thereof" 608
No. 32. An act to provide for the employment of certain subordinate employees, in addition to those provided for in Acts Nos. 13 and 17, in the office of the superintendent of schools and in the public school system of the Moro Province 609
No. 33. An act appropriating the sum of 92,416 pesos, in Philippines currency, or so much thereof as may be necessary, in part compensation for the fiscal year 1904, and for other purposes 609
No. 34. An act appropriating the sum of 892 pesos and 85 centavos, Philippines currency, to pay the reward offered by the civil governor of the Philippine Islands for information leading to the arrest and conviction of the murderers of Frank Helm 613
No. 35. An act to amend Act No. 82 of the Philippine Commission, entitled "The municipal code," as amended, in its application to the Moro Province 613
No. 36. An act appropriating the sum of 28,000 pesos, Philippines currency, or so much thereof as may be necessary, for the construction and repair of roads in the Moro Province, the construction of a schoolhouse at Davao, and in part payment of a provincial jail at Zamboanga 633
No. 37. An act appropriating the sum of 600 pesos, Philippines currency, or so much thereof as may be necessary, to defray the current expenses of the town of Jolo, district of Sulu, for the month of January, 1904 633
No. 38. An act providing for the organization and government of the municipalities of Jolo, Siassi, and Cagayan de Sulu 638
No. 39. An act temporarily to provide for the government of the Moros and other non-Christian tribes 633
No. 40. An act empowering the governor of the Moro Province to offer a reward of any sum not exceeding 1,000 pesos, Philippines currency, for information leading to the arrest and conviction of the perpetrators of crime in the Moro Province 639

Report of the governor of Moro Province—Continued. Page.
Acts of the legislative council of Moro Province—Continued.
No. 41. An act authorizing the governor of the Moro Province to designate not to exceed five civil service employees of the province to aid in the translation of public laws, and providing for the payment of an overtime wage to such employees ---- 640
No. 42. An act to provide for the levy, assessment, and collection of an ad valorem tax on land ---- 640
No. 43. An act to provide in part for the protection of pearl fisheries within the jurisdiction of the Moro Province ---- 648
No. 44. An act to provide for the employment of one clerk, class II, in addition to the employees provided for in Act No. 23, in the office of the governor of the district of Cotabato, and fixing the salary thereof ---- 649
No. 45. An act appropriating the sum of 65,697 pesos and 95 centavos in Philippines currency, or so much thereof as may be necessary, in part compensation for the fiscal year 1904, and for other purposes ---- 649
No. 46. An act appropriating the sum of 5,000 pesos, Philippines currency, for the repair and reconstruction of the government wharf at Zamboanga ---- 653
No. 47. An act subjecting the use, licensing, and registration of boats of Moro or pagan construction to the provisions of the general customs administrative law ---- 653
No. 48. An act to amend Act No. 35 of the legislative council, entitled "The municipal code of the Moro Province" ---- 653
No. 49. An act appropriating the sum of 1,998 pesos and 93 centavos, Philippines currency, or so much thereof as may be necessary, for sundry expenses of the government of the Moro Province for the third and fourth quarters of the fiscal year 1904 ---- 654
No. 50. An act creating district boards ---- 654
No. 51. An act regulating the fishing for shells of marine mollusca, and amending Act No. 43 of the legislative council ---- 654
No. 52. An act to provide for the payment of the costs of criminal prosecutions and preliminary investigations before justices of the peace appointed in accordance with the provisions of section 27 of Act No. 787 of the Philippine Commission, as amended by Act No. 1164 of the Philippine Commission ---- 657
No. 53. An act amending section 1 of Act No. 12 of the legislative council, entitled "An act to provide for the employment of certain subordinate employees in the office of the engineer of the Moro Province and fixing the salaries thereof" ---- 658
No. 54. An act appropriating the sum of 3,154 pesos and 10 centavos, Philippines currency, or so much thereof as may be necessary, for the construction of bridges at Jolo ---- 658
No. 55. An act appropriating the sum of 1,850 pesos, Philippines currency, or so much thereof as may be necessary, for the construction in the municipality of Zamboanga of a public market for the especial use of the Moro and other non-Christian inhabitants of the district of Zamboanga, and providing for the administration thereof ---- 659

eport of the governor of Moro Province—Continued. Page.
Acts of the legislative council of Moro Province—Continued.
No. 56. An act to provide for the employment of temporary clerks to aid in the preparation of the tax list of the municipality of Zamboanga for the year 1904, and to authorize the payment of extra compensation to native teachers on vacation so employed. 659
No. 57. An act authorizing the employment, under certain conditions, of enlisted men of the United States Army as skilled laborers on public works 660
No. 58. An act appropriating the sum of 164 pesos, Philippines currency, or so much thereof as may be necessary, for the payment of the salaries of the temporary clerks appointed under the provisions of Act No. 56 of the legislative council 660
No. 59. An act appropriating the sum of 11,000 pesos, Philippines currency, from the 300,000 pesos of the Congressional relief fund allotted the Moro Province for the emergency improvement of the Iligan-Lake Lanao road 660
No. 60. An act appropriating the sum of 1,500 pesos, Philippines currency, for the repair and reconstruction of the government wharf at Zamboanga 661
No. 61. An act appropriating the sum of 81,938 pesos and 85 centavos in Philippines currency, or so much thereof as may be necessary, in part compensation for the fiscal year 1905, and for other purposes 661
No. 62. An act amending section 1 of Act No. 12 of the legislative council, entitled "An act to provide for the employment of certain subordinate employees in the office of the engineer of the Moro Province and fixing the salaries thereof" 665
No. 63. An act appropriating the sum of 25,490 pesos and 70 centavos in Philippines currency, or so much thereof as may be necessary, for certain public works and permanent improvements of the government of the Moro Province 665
No. 64. An act making additional appropriations for sundry expenses of the government of the Moro Province for the first quarter of the fiscal year ending June 30, 1905, and for other purposes 666
No. 65. An act to provide for the employment of one clerk, class 9, in addition to those provided for in act No. 1, in the office of the provincial treasurer, and fixing the salary thereof 667
No. 66. An act amending section 1 of Act No. 21 of the legislative council, entitled "An act providing for the establishment of the municipalities of Mati, Davao, Makar, Cotabato, Malabang, Dapitan, Cateel, Baganga, and Caraga, and enlarging the municipalities of Iligan and Zamboanga" 667
No. 67. An act to prevent the further introduction into the Moro Province of epidemic diseases of large cattle, and to provide measures for the suppression of the present epidemic of such diseases, and making appropriation for the expenses thereof 668
No. 68. An act to provide for the employment of a temporary clerk in the registry of property and making appropriation for the payment of the salary thereof 670
No. 69. An act authorizing the governor of the Moro Province to establish harbor lines for the preservation and protection of the harbors, bays, and navigable lakes and rivers of the province 670

Report of the governor of Moro Province—Continued. Page.
Acts of the legislative council of Moro Province—Continued.
No. 70. An act to provide for the employment of one teacher, in addition to those provided for in Acts Nos. 17 and 32 of the legislative council of the Moro Province, in the public school system of the Moro Province ... 670
Report of Capt. George T. Langhorne on trip to Sarawak, Java, and the Federated Malay States ... 671

PART III.

Report of the department of commerce and police ... 1
Bureau of Philippine Constabulary ... 1
Information division ... 3
Telegraph division ... 4
Medical division ... 4
Ordnance department ... 4
Bureau of coast guard and transportation ... 4
Light-houses ... 5
Engineer Island ... 5
Bureau of engineering ... 6
Bureau of posts ... 9
Bureau of prisons ... 9
Benguet improvements ... 10
Naguilian ... 11
Benguet ... 11
Bureau of coast and geodetic survey ... 12
Telephones ... 12
Harbor lines commission ... 13
Appendixes:
Report of the chief of the Philippines Constabulary ... 15
Report of the first district ... 67
Report of the second district ... 82
Report of the third district ... 91
Report of the fourth district ... 97
Report of the fifth district ... 121
Report of the chief of the bureau of coast guard and transportation ... 127
Report of the light-house engineer ... 134
Report of the division of light-house maintenance ... 154
Report of the division of vessels ... 158
Report of the coast-guard cutter Tablas ... 182
Report of the disbursing officer ... 186
Report of the paymaster ... 189
Report of the bureau of engineering ... 192
Report of the division of railroads ... 223
Report of the chief of supervisors ... 245
Report of Benguet improvements ... 257
Report of Benguet road ... 260
Report of the bureau of posts ... 276
Report of the bureau of prisons ... 314
Report of the resident physician ... 332
Report of the bureau of coast and geodetic survey ... 339
Report of the secretary of finance and justice ... 349
Administration of justice ... 349

Report of the secretary of finance and justice—Continued.	Page.
New legislation relating to courts	351
Court of customs appeals	353
Court of land registration	353
Criminal code and code of criminal procedure	356
Changes in the personnel of the courts	357
Attorney-general's office	358
Insular cold-storage and ice plant	359
Currency	360
New coinage and seigniorage	360
Amount of new coinage received and in circulation	361
Estimation of old currency	363
Silver certificates	363
Islands now practically on a gold basis	364
Exchange sold from the gold-standard fund	365
How these results were accomplished	365
Banks and banking	369
The customs service and the tariff	378
The new internal-revenue law	384
The treasury and auditor's office	390
Congressional relief fund	393
Friar lands funds	393
Insular budget	394
Budget of city of Manila	397
Financial condition of the provinces and municipalities	398
Exhibit 1.—Report of the clerk of land registration	403
Exhibit 2.—Report of the attorney-general for the Philippine Islands	409
Exhibit 3.—Report of the superintendent of the insular cold-storage and ice plant	436
Exhibit 4.—Report of the acting superintendent of the insular cold-storage and ice plant	478
Exhibit 5.—Receipts and disbursements of the insular cold-storage and ice plant	486
Exhibit 6.—Report of the chief of the division of currency	487
Exhibit 7.—Report of the collector of customs for the Philippine Islands	504
Appendix A.—Comparative statistical summaries	540
Appendix B.—Vessels inspected and granted certificates at the port of Manila	575
Appendix C 1.—Official numbers and signal letters of coastwise vessels	577
Appendix C 2.—List of vessels to which official numbers have been assigned in the Philippine Islands	581
Appendix C 3.—Supplemental list of vessels to which certificates of protection have been issued	616
Appendix D.—Parts of internal-revenue law of 1904, with temporary rules for the collection of the tax on imported matches, and designating certain customs officers as internal-revenue collectors for that purpose	621
Appendix E.—Regulations for the division of special agents of the Philippine customs service	624
Appendix F.—Special report of the insular collector of customs on the registration of Chinese persons in the Philippine Islands	628

Report of the secretary of finance and justice—Continued. Page.
Exhibit 7.—Report of the collector of customs for the Philippine Islands—Continued.
Appendix G.—Report of the deputy surveyor of customs in charge of Arrastre 653
Exhibit 8.—Report of the acting collector of internal revenue 659
Exhibit 9.—Report of the collector of internal revenue 662
Exhibit 10.—Report of the auditor for the Philippine Islands 682
Report of the secretary of public instruction 811
Bureau of education 813
Organization 813
General superintendent 814
Division superintendents 815
Teaching force 816
Filipino teachers 819
Primary schools 821
Intermediate schools 822
Secondary schools 823
Philippine normal school 824
School of arts and trades 825
Nautical school 826
Schools in the Moro Province 827
Pagan schools 828
Students sent to the United States 829
School buildings 831
Cost of public instruction 833
Bureau of architecture and construction of public buildings 835
Bureau of public printing 839
Value of product and cost of production 839
Matters of general interest 840
Instruction of native craftsmen and apprentices 841
Bureau of archives 842
American Circulating Library 844
Official Gazette 845
Exhibit A.—Report of the general superintendent of education 847
Exhibit B.—Report of the superintendent of Filipino students in the United States covering the Filipino student movement 919
Exhibit C.—Report of the chief of the bureau of architecture and construction of public buildings 931
Exhibit D.—Report of the public printer 946
Exhibit E.—Report of the chief of the bureau of archives 954
Exhibit F.—Report of the trustee of the American Circulating Library 961
Exhibit G.—Report of the editor of the Official Gazette 964
Report of the Chief of the Bureau of Insular Affairs 973

REPORT

OF THE

SECRETARY OF THE INTERIOR.

SEPTEMBER 1, 1903, TO AUGUST 31, 1904.

FIFTH ANNUAL REPORT

OF THE

PHILIPPINE COMMISSION.

REPORT OF THE SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR,
Manila, P. I., October 28, 1904.

GENTLEMEN: I have the honor to present the third annual report of the secretary of the interior, which, unless otherwise expressly stated, covers the year ending August 31, 1904.

ORGANIZATION OF THE DEPARTMENT.

The taking effect of "the public-land act" and of Act No. 1120, which provided that the friar lands should be administered by the bureau of public lands, imposed a greatly increased volume of work upon that bureau, necessitating its reorganization.

The mining bureau has also been reorganized in order to make possible active field operations, the examination, briefing, and indexing of the old Spanish records, which had heretofore largely occupied the time of the officers and employees of this bureau, having been completed.

The bureau of fish and fisheries, originally provided for by Act No. 222, has not yet been organized. So long as the present financial condition of the insular government continues its organization is hardly practicable. The undersigned is of the opinion that the important work planned for this bureau may ultimately be best and most economically provided for by the addition of a new division to the bureau of government laboratories rather than by the creation of a new bureau.

OPERATIONS OF THE DEPARTMENT FACILITATED BY THE STATE OF PUBLIC ORDER.

In view of the preposterous statements which have from time to time appeared in the public press relative to the state of public order in these islands, it may be worth while to state what has been the experience of this department in carrying on its work during the past year.

The bureau of forestry has its agents in every province of the archipelago.. The nature of their work is such as often to necessitate their

residing in wild and remote regions. In protecting the public forests from depredations and in going from place to place to measure and value timber they are constantly compelled to make long journeys unarmed and without guards. Similarly the agents of the board of health for the Philippine Islands must visit all of the provinces, in order to inspect the work of local health officers or themselves to carry on active operations in combating epidemic disease among the inhabitants or among domestic animals. The botanists of the bureau of government laboratories have made long trips into many of the provinces and have lived for months at a time in remote and comparatively inaccessible regions. Other employees of the bureau of laboratories have traveled extensively in the provinces in gathering samples of forest products, minerals, etc., for study, as have the collectors of natural-history specimens. Officers and employees of the mining bureau have traveled very extensively in the provinces in prosecuting the field work of that bureau, and the chief of the bureau has crossed the island of Mindoro from west to east. The work of the officers and employees of the ethnological survey is of such a nature as to take them among the wildest people of the archipelago. The acting chief of the survey has crossed the island of Mindanao from north to south within the past year. Observers of the weather bureau are scattered throughout the archipelago. The bureau of agriculture has seven farms and experiment stations outside of Manila, and many of its employees have traveled extensively in the provinces. This is especially true of the soil physicist. The undersigned has himself had occasion during the past nine months to travel, unarmed and without a guard, in the provinces of Benguet, Pangasinan, Tarlac, Pampanga, Bulacan, Rizal, La Laguna, Batangas, and Paragua.

In spite of the fact that the operations of this department have covered every province and practically every island of any size in the archipelago, no one of its officers or employees has, so far as the undersigned is aware, been attacked, threatened, or molested in any way whatsoever during the period covered by this report.

BOARD OF HEALTH FOR THE PHILIPPINE ISLANDS AND THE CITY OF MANILA.

GENERAL HEALTH CONDITIONS.

Health conditions have been generally good throughout the islands. There has been no great epidemic of disease among the inhabitants of the archipelago. Cholera has completely disappeared; local epidemics of smallpox have been promptly checked; bubonic plague has disappeared from Cebu and has been held within very narrow limits at Manila; rinderpest has been promptly and effectively dealt with wherever it has appeared, so that the natural increase among horned cattle is steadily replenishing the stock of draft animals.

Surra, for which no cure has as yet been found, has continued to cause serious losses among horses both native and imported, among mules, and among the carabaos imported from China by the insular government, whole herds of the latter animals having in several instances been practically exterminated. Fortunately this disease rarely attacks the native carabaos. It is believed that the only really effective method of dealing with surra would be to make a microscopic

examination of the blood of all domestic animals subject to it, and to kill every animal found to be infected. While such a course would in the end save heavy losses, it is the opinion of the undersigned that the time has not arrived when public sentiment would support the employment of such drastic measures. When the disease has become better known, and the fact that it is invariably fatal to horses is more fully realized, it may be that the measures necessary in effectively dealing with it will receive sufficient support from the people to make them practicable.

VITAL STATISTICS.

The law provides that the board of health shall have general supervision over the public health of the Philippine Islands and shall especially study their vital statistics. It has proved extremely difficult, and so far as births are concerned impossible, to secure satisfactory statistics, even in the city of Manila. The unremitting efforts of the board of health are, however, producing results, and it is hoped that during the next year fairly accurate statistics may be obtained for Manila at least. The number of births actually reported for the city during the past year was: Filipinos, 6,182; Spaniards, 40; Americans, 61; all others, 58; total, 6,341. As physicians or registered midwives are summoned by the Filipinos in a relatively small number of cases, these returns are known to be very incomplete. The estimated number of births for this period is 13,000.

The record of deaths, which is much more easily kept than is that of births, is believed to be very accurate. It shows 10,781 deaths, exclusive of transients, during the year. This gives a death rate of 49.01 per thousand, if the official census returns, which showed a population of 219,941, are to be accepted as correct. Three hundred and seventy-six deaths were caused by cholera, 84 by bubonic plague, and 25 by smallpox. It will be noted that the proportion of deaths from smallpox is lower than that in many of our American cities, a fact which bears eloquent testimony relative to the efficiency of the campaign which has been waged against this disease by the board of health. The deaths from cholera were to a considerable extent due to the discovery and use for drinking purposes by the Filipinos of a so-called "sacred spring" of fresh water, which appeared in the bay off Tondo beach and was, in point of fact, caused by the breaking of an old sewer pipe. The people flocked to this place to drink sewage diluted with sea water, and many were infected with cholera before the facts became known to the board of health. A guard was then placed over the "spring" to prevent its further use.

The death rate per thousand by nationalities was as follows: Americans, 9.34; Spaniards, 15.42; other Europeans, 16.11; Chinese, 21.85; Filipinos, 53.72; all others, 17.88. These figures show that the death rate was lowest among Americans and highest among Filipinos, and demonstrate the importance of observing ordinary sanitary precautions, which are neglected more frequently by Filipinos than by any other nationality represented at Manila. The general use of tea and of recently cooked foods by the Chinese undoubtedly prevents much disease among them. They are, however, especially susceptible to bubonic plague.

Infant mortality.—There were 1,213 deaths of infants under thirty days of age and 4,901 of infants thirty days to one year of age.

Fifty-three and eight-tenths per cent of all deaths, including transients, were therefore among young infants. They were largely due to ignorance, which led to infection at birth, and to improper feeding when it was necessary to supplement or replace the natural food by other substances. The impossibility of obtaining fresh milk and the difficulty of preserving even canned milk after it has been opened have been important factors in this result.

A circular relative to the care of infants, which was prepared by a committee of Filipino and Spanish physicians, has been translated into all of the more important native languages and widely distributed in Manila and the provinces. Filipino physicians have greatly aided in its circulation, and beneficial results are hoped for, although they will come slowly at the best.

The board of health has furnished cloth for wrapping the new-born infants of the poor of Manila to prevent the chilling, which frequently causes death if infants are not properly wrapped.

There is crying need of a large maternity hospital for Filipino women and of a training school for Filipino nurses and midwives in connection with such a hospital. Were such an institution available, an educational campaign of the greatest value might be inaugurated. The plans for the proposed general hospital include a large maternity ward, and while new hospital buildings must of necessity be constructed gradually as funds become available, it is sincerely hoped that this ward may be erected and equipped in the near future.

Lack of medical attendance.—Fifty-two per cent of the deaths of the year are reported to have occurred without medical attendance.

Healthfulness of different districts.—Ermita, with a death rate of 23.47 per thousand, continues to be the most healthful district of the city, and Paco, with a death rate of 78.51, the most unhealthful. The rate of Tondo, which was 78.14 per thousand, is practically as bad as that of Paco; in point of fact, it is believed that the apparently high death rate for Paco is due to an error in the census returns, and that Tondo is really the most unhealthful district in the city. Necessary steps have been taken to secure a recount of the inhabitants of Paco.

Morgue.—During the year 634 bodies were received at the morgue of the board of health, of which 430 were disposed of by burial and 204 by cremation. One hundred and ninety-five autopsies were held for the purpose of determining cause of death.

NEED OF PUBLIC BATH HOUSES AND LAUNDRIES.

The commissioner of public health in his annual report again calls attention to the great need of public bath houses and laundries, and cites facts which show conclusively the disastrous results which follow bathing and the washing of clothes in the Pasig River, and more especially in the filthy esteros or tidal creeks connected with it. The city authorities should give early attention to providing public baths and laundries, and it is understood that they contemplate doing so.

ESTEROS AND TIDAL CREEKS.

The condition of the esteros or tidal creeks which extend throughout many portions of the city has materially improved during the



WASHING IN AN ESTERO.
Photograph by Martin.



TYPICAL LOWLANDS OF MANILA.

Photograph by Martin.

past year owing to the combined efforts of the board of health and the street department, which have resulted in gradually decreasing the amount of night soil and other filth dumped into them. Further improvement has resulted from dredging operations, which were begun sometime since and are being actively prosecuted. The conditions of the esteros is, however, still bad and must necessarily remain so until they have been deepened, straightened, and provided with proper walls and with water connections which will allow of their being frequently and thoroughly flushed. The installation of the proposed new sewer system will also lead to great improvement in their condition.

LOW LANDS.

Material progress has been made during the past year in filling low lands near the more populous districts of the city, but an immense amount of work remains to be done. The board of health has been authorized to draft an ordinance providing for the filling in of such lands, subject, however, to the provision that no order for the cleansing, drainage, or filling in of lands involving a cost of more than 300 pesos, Philippines currency, shall be effective without the approval of the Secretary of the Interior. Such limitation was believed to be necessary for the reason that in many instances the cost of filling low lands would be entirely beyond the means of their owners, so that the enforcement of an order requiring such filling would amount to confiscation. If the filling of such lands is a necessity, in order that the public health may be preserved, and if the cost involved is so great as to be out of all due proportion to the present value of the lands filled, a portion of such cost should manifestly be borne by the municipal government.

MOSQUITOES.

Mosquitoes are abundant in those parts of the city adjacent to marshy lands or to the esteros. The improvement of the esteros and the draining and filling of the low lands are essential to any successful effort to get rid of these pestiferous insects, which play such an important part in the communication of disease. Fortunately, malaria-bearing mosquitoes occur in relatively small numbers. Only 181 deaths from malarial causes were recorded in Manila during the past year. One of the common mosquitoes is of a species which under favorable conditions transmits yellow fever. This disease has never yet entered the Philippines, and there is probably little danger that it will do so prior to the completion of the Panama Canal, for the reason that the mosquitoes which transmit it can, under existing conditions, hardly survive long enough to make the trip from countries where yellow fever occurs. The opening up of the Panama Canal, however, will afford more rapid communication between yellow-fever countries and the Far East. Should the disease be introduced here under present conditions a widespread epidemic would inevitably result, and it is therefore important that measures for the abatement of the mosquito plague should be prosecuted as actively as circumstances will permit. Some fairly successful experimental work has already been done.

LEPER COLONY.

The policy of colonizing the lepers of the Philippines upon some well-isolated island with a view to improving their condition, furnishing them with proper medical care, preventing their communicating leprosy, and at the same time allowing them to live as normal a life as possible, was long since decided upon. The search for a suitable island resulted in the selection of Culion, which, while far removed from the more important lines of travel, is still quite centrally situated with reference to the archipelago as a whole. Culion has a comparatively cool and very healthful climate and a very sparse population, the latter condition of affairs being doubtless due to the fact that the agricultural lands of the neighboring island of Busuanga are more extensive, rich, and readily accessible from the sea than are those of Culion.

Fifty thousand dollars were appropriated for the establishment of a leper colony by Act No. 490, on October 27, 1902.

A provisional site was selected near an extensive valley of rich agricultural land in the west central portion of the island, where it was believed that adequate accommodations could be furnished for all the lepers of the Philippines. Work at this site had barely commenced when there occurred the worst drought which the islands had experienced in fifty years. The streams throughout the affected region, which included Culion, shrank greatly, and in many instances disappeared. The governor of Paragua, who visited the proposed site at this time, reported to the Commission that the water supply was inadequate. Thorough investigation of this question was obviously necessary, and the occasion was most opportune, as the extraordinary drought rendered it certain that if sufficient water then existed there would be no likelihood of any future failure of the supply. Work was accordingly suspended until an engineering party could complete a thorough investigation. Their report showed that the apprehensions of the governor of Paragua and of others who had reported the water supply inadequate were groundless, as water sufficient for 2,500 people could be immediately developed at small expense, and an adequate supply for 10,000 additional persons could be secured by the erection of a dam.

Meanwhile, however, a leper census of the islands had shown conclusively that previous reports as to the number of lepers had been grossly exaggerated, and that so large an extent of territory as had been originally deemed necessary for colonizing them would therefore not be required. The board of health now has a record of 3,632 lepers, of whom 457 are cared for in leper institutions.

The site originally selected had one great disadvantage in that all supplies would necessarily have to be transported overland for a distance of 3 to 4 miles. It was found that adequate accommodations could be provided for all leprous women at the old town of Culion, and that sufficient agricultural lands were available at the neighboring barrio of Baldat to make it feasible to colonize at this place nearly if not quite all of the leprous men. It was therefore decided to purchase and renovate the buildings in the town of Culion and to erect necessary structures at Baldat. As both of these sites are readily accessible by water, the problem of land transportation has been eliminated.

The town of Culion is situated on a high promontory which has an excellent harbor on each side of it. All supplies for the colony will be landed at this place, and such portion of them as may be required at Baldat will be transferred in lighters by way of a shallow but well-protected bay and a short tide-water creek.

Medical Inspector C. F. De Mey, who had previously been in charge of the San Lazaro Hospital and who had won the good will of all the lepers confined there by the kind treatment and good care which he gave them, was placed in charge of the work of construction, and has since been made director of the colony. Doctor De Mey combines adequate professional knowledge with unusual linguistic accomplishments, great energy, and remarkable tact and skill in managing laborers. He is thoroughly familiar with the best methods of constructing buildings of light materials (bamboo and nipa palm), and buildings of this sort will be generally used for the lepers, owing to the fact that they are inexpensive and at the same time cooler and more sanitary than any other structures thus far erected in the Tropics.

Doctor De Mey secured a good force of Filipino laborers from the neighboring island of Cuyo. The buildings and land included in the old town site having meanwhile been purchased at a moderate price by the chief of the bureau of public lands, active operations were at once begun. The town was completely transformed by removing the accumulated filth of years, by clearing away all superfluous vegetation, by grading and graveling old streets and constructing new ones, and by renovating old buildings and erecting such additional structures as were deemed necessary. A pier was built out to water 24 feet deep at low tide, and running water of excellent quality was piped into the town. This work was accomplished in spite of rains of almost unprecedented persistence and violence.

A large number of lepers could be housed comfortably at Culion at the present time, but in view of the possible risk to laborers and the certainty that many of them would be unwilling to continue work if lepers were brought there, it has been deemed advisable first to complete a majority of the buildings to be erected and then to bring leprous men to Culion, transferring the present force of laborers to Baldat. Some additional building can be done at Culion by leprous men who are willing and able to work, and after the completion of necessary buildings at Baldat the men can be transferred to that place, and the original plan of colonizing the women at the town of Culion can be carried out.

It is hoped that the appropriation originally made for the establishment of the leper colony, which did not contemplate the purchase of buildings or land, may prove sufficient for the erection and equipment of all necessary buildings and for the transportation and establishment at Culion of at least 3,000 lepers.

A considerable number of those whose buildings and land at Culion were purchased by the government promptly attempted to establish themselves elsewhere on the island, with the obvious intention of securing holdings which the government might eventually find it necessary to purchase. In order to put a quietus on this movement, all the government land in the island was set aside by executive order No. 35, issued August 22, 1904, as a government reservation for a leper colony and a stock farm. The stock farm, which will

help supply the colony with beef, is located at a point so remote from the site of the colony that the two institutions will in no way interfere with each other.

Recent investigations have shown that there is a large amount of available agricultural land belonging to the government in the neighboring island of Busuanga upon which the relatives and friends of lepers, who desire to be near them, can be allowed to settle.

SMALLPOX AND VACCINATION.

The work of vaccination has been vigorously carried on at Manila from the day of American occupation, the number of recorded vaccinations being as follows:

1898 (two months)	10,477
1899	103,931
1900	60,592
1901	73,891
1902	133,803
1903	148,714
1904 (eight months)	151,463

During the past year there have been but 73 cases of smallpox in the city, with 32 deaths. The cases were practically confined to persons who had not been vaccinated.

A comprehensive plan for the frequent vaccination of the entire population of the islands has been elaborated and is being carried out. The board of health has kept a force of vaccinators in every province of the archipelago. Sporadic outbreaks of smallpox have been promptly checked and, as previously stated, no general epidemic has occurred. So far as is known, no serious results have followed any vaccination either in Manila or in the provinces, which is sufficient testimony as to the care with which vaccine virus is prepared by the bureau of government laboratories and as to the precautions observed by agents of the board of health in using it.

Plans for the work both in Manila and in the provinces were made by Dr. Edward L. Munson, captain and assistant surgeon, U. S. Army, who, until the failure of his health necessitated his return to the United States, rendered efficient and valuable services as assistant to the commissioner of public health. Under the plans perfected by Doctor Munson vaccinators are thoroughly trained under close observation at Manila before being sent into the provinces, and are carefully instructed as to the technique of their work, as to their conduct toward persons whom it is necessary for them to vaccinate, and as to the existing provisions of law relative to vaccination. As a result, the wasting of valuable virus through improper care or through its use in an improper manner is largely avoided, and complaints of improper conduct on the part of vaccinators have been very few. Persons who have been successfully vaccinated are given certificates to this effect to prevent their needless revaccination. Adequate inspection has been maintained over the work of vaccinators in the provinces as well as in Manila.

One million four hundred and thirty thousand seven hundred and thirty-five units of vaccine virus have been sent to the provinces during the past year, and the commissioner of public health is of the opinion that the exact number of vaccinations will not fall far short of the number of units of vaccine virus distributed. The

greatest difficulty encountered in the provinces arose from the lack of transportation facilities and the consequent loss of virus through long-continued exposure to heat. The board of health now transports virus in special ice boxes, which have proved of great assistance in preserving it.

The opposition to vaccination, which was at first frequently encountered, is rapidly disappearing since the plan of sending out intelligent and neatly uniformed men from Manila and of exercising a careful supervision over their operations has been adopted. While much remains to be done before the work of immunizing the people of this archipelago against smallpox can be considered even fairly complete, the progress made during the past year is very gratifying, and the disease has ceased to be the scourge that it was a few years since.

ASIATIC CHOLERA.

The epidemic of Asiatic cholera which began on March 20, 1902, seemed to have practically ceased at the time the last annual report of the secretary of the interior was submitted. It was then believed that the occasional cases which were occurring would diminish in number until the disease finally disappeared. This expectation was realized, the last case occurring on April 27, 1904.

While the more important facts relative to this epidemic have already been published, there has now been opportunity for a revision of statistics and for more critical examination and compilation of reports, and, the epidemic having now ended, can be considered in its entirety. It has been so considered in the report of the commissioner of public health for the year ending August 31, 1904 (Appendix A), to which those who are particularly interested in this subject are referred for detailed information.

In Manila, which was constantly exposed to reinfection from the provinces, there were but 5,581 cases of cholera during the entire period of the epidemic, which shows what can be done toward combating this disease under most unfavorable circumstances if the necessary men and means are available.

BUBONIC PLAGUE.

There were 87 cases of bubonic plague at Manila during the year, as against 200 for the previous year. This gratifying result was largely brought about by immunization of the Chinese population against this disease, to which they are especially susceptible. The Chinese have submitted cheerfully to the necessary inoculations, which have not in any instance been attended with harmful results.

One custom-house employee died of tetanus after being inoculated against plague. Careful examination of the serum used, together with the fact that various other persons inoculated at the same time with the same serum developed no unusual symptoms, demonstrated conclusively that the disease was not communicated by the serum, nor is it certain that it entered by the wound made by the inoculation, although this is possible, as the patient had removed bandages and scratched his arm in the vicinity of the puncture made by the hypodermic syringe.

The entire freedom of the rats of the city from plague throughout the year has been a most encouraging feature of the situation.

Bubonic plague appeared in the city of Cebu, which was in an intolerably unsanitary condition. Great difficulty was encountered in getting the city cleaned up, owing to the apathy or active hostility of provincial and municipal authorities, but all obstacles were finally overcome, and some four months have now elapsed since a case of plague has been reported there.

HEALTH WORK IN THE CITY OF MANILA.

The act providing for the establishment of the board of health for the Philippine Islands also provides that it shall act as a local health board for Manila. While it was obvious that some practical difficulties were likely to be encountered in the carrying on of health work in this city by an insular board the members of which were not subject to the control of the municipal government, it was believed that the difficulties, when encountered, could be overcome, and that the establishment of a municipal board of health for Manila would involve needless expense and would be likely to result in clashes of authority between such a board and the insular board, and that the probability of importation to Manila and thence to the islands at large of dangerous epidemic diseases from the Asiatic coast was so great as to justify the insular government in taking into its own hands the safeguarding of the health of the city. Further reason for the action taken was afforded by the fact that the city was not able to pay the necessary cost of its sanitary regeneration, which from the outset has fallen on the insular government.

While the system worked well from the start, clashes of authority did from time to time occur, owing in part to somewhat contradictory provisions in the Manila charter and in the laws defining the powers and duties of the board of health. The whole question of the relationship of the board of health and the municipal authorities was therefore made the subject of careful consideration, and Act No. 1150, "Further defining the powers and duties of the board of health for the Philippine Islands and of the municipal board of the city of Manila, in connection with the preservation of the public health of that city, and repealing certain provisions of law relative thereto," was ultimately adopted.

This act provides for the drafting of health ordinances by the board of health and their transmission to the municipal board of Manila for enactment. The municipal board may, however, return them to the board of health with suggested changes, and in the event that changes deemed to be of importance are not adopted by the board of health the municipal board may apply to the civil governor, whose duty it then is to prescribe the form which the ordinance shall take.

The subjects relative to which health ordinances may be enacted are carefully defined. Sanitary inspections are made under the general supervision and control of the commissioner of public health by district medical inspectors of the board of health, by such members of the police force of the city of Manila as are designated as sanitary police by the chief of police, and by such sanitary inspectors as may be authorized by law. The substitution of many sanitary inspectors by

members of the Manila police force makes possible a material reduction in salaries without loss of efficiency, the trained and experienced force of district medical inspectors being retained, together with a certain number of the best sanitary inspectors, who are kept as a reserve force with which to meet possible emergencies.

The work of inspecting the construction, repair, removal, and safety of buildings, and their ventilation, drainage, and plumbing is performed by the city engineer's office, as is that of collecting and disposing of excreta, garbage, refuse, and other unwholesome or dangerous substances.

The municipal board is empowered to pass ordinances regulating the business and fixing the location of establishments likely to endanger the public safety by giving rise to conflagrations or explosions, and to construct, maintain, and regulate the navigation of canals and water courses and to cleanse and purify the same; to drain and fill private premises when necessary; to establish and maintain public sewers, latrines, and cesspools, and to provide for the establishment of public laundries, stables, and bath houses.

In brief, under the new arrangement the board of health determines what shall be done in sanitary matters and the city does it, either independently or under the general supervision of officers of the board of health. In the event of failure on the part of the municipal authorities satisfactorily to discharge the duties imposed on them by this law, the health authorities have the right of appeal to the civil governor.

The fact has been recognized that the outbreak of an epidemic of infectious, contagious, or communicable disease may create conditions which can not satisfactorily be met by methods which are ordinarily adequate, and the law provides that when, in the opinion of the board of health, the city is threatened with an epidemic of infectious, contagious, or communicable disease the commissioner of public health shall so inform the civil governor, and may request the civil governor to issue an executive order declaring that the city is threatened with an epidemic and vesting the board of health with emergency powers. In the event that the civil governor issues such an order, the board of health then has power to enact, subject to the approval of the secretary of the interior, such emergency health ordinances as it may deem necessary to prevent the occurrence or spread of infectious, contagious, or communicable disease, and to appoint such temporary emergency employees as may be authorized by law.

When in the opinion of the civil governor the danger of an epidemic has passed, he shall so declare by executive order, and all emergency health ordinances become of no effect, unless the executive order specifically declares that one or more of them are continued in effect for a further period of time.

Since the passage of this act the health work of the city has been carried on with less friction and more efficiency than ever before, and it is believed that the new arrangement thus effected will prove both theoretically sound and practically feasible and satisfactory.

Sanitary inspections.—Although some interruption of the work of sanitary inspection was caused by the discharge of a large number of trained employees and their substitution by members of the Manila police force, there were made during the year in the city of Manila 408,318 inspections and reinspections of houses; 49,511 houses

were cleaned as a result of such inspections; 235 houses were whitewashed and painted; 3,076 were disinfected; 115 were condemned and removed; 2,199 cesspools were cleaned; 19,079 yards were cleaned; 300 yards were repaired or repaved; 82 cholera cases, 70 smallpox, and 95 plague cases were reported; 3,267 sanitary orders were complied with by householders, and 42 convictions were secured for failure to comply with sanitary orders.

While the people of Manila, like those of other cities, object to domiciliary visitations, the rigid restrictions imposed by the board of health upon sanitary inspectors have resulted in the steady improvement of the inspection service, and while necessary domiciliary inspections are now made, as heretofore, complaints of improper conduct on the part of inspectors, which were formerly very numerous, have almost entirely ceased.

Division of sanitary engineering.—The position of sanitary engineer for the city of Manila has been abolished for the reason that clashes of authority between this official and the sanitary engineer for the Philippine Islands were frequent, and for the further reason that all necessary sanitary engineering work for the city of Manila can be performed by the sanitary engineer for the Philippine Islands and by the city engineer.

SANITARY WORK IN THE PROVINCES.

While the difficulties in the way of sanitary work in Manila have been great, those encountered in the provinces are sometimes wellnigh insuperable. Thirty-two of the 40 provinces have provincial boards of health, and in three of the provinces which are without such boards medical inspectors of the board of health or surgeons of the Philippines constabulary have been detailed to perform the duties of presidents of provincial boards of health. There are municipal boards of health in 286 of the 706 organized municipalities.

It is believed by the undersigned that in filling the important position of president of provincial board of health the best men available have been appointed. Of these a limited number have from the first shown themselves to be thoroughly trained, energetic, and capable officers. A large number have obviously done their best, but through defects in training and lack of executive ability have failed to secure satisfactory results. A relatively small number have proved wholly incompetent or have neglected their duties, and have been removed for cause. Unfortunately, when such officers are removed it is by no means always possible to secure in their places men who give promise of being more satisfactory.

Many of the presidents of municipal boards of health are very incompetent. In a majority of the municipalities there does not exist a person with any medical training whatever, and the ignorance as to the most ordinary sanitary precautions displayed by the populace at large is dense in the extreme. The whole situation is one of great difficulty and can be satisfactorily met only by patient and persevering work extending over a sufficient period of time to allow of the gradual education of the masses and the development of a corps of thoroughly trained Filipino physicians large enough to provide at least one competent man for each important municipality in the islands.

Meanwhile many of the presidents of provincial boards of health show willingness and ability to learn when given an opportunity. With a view to increasing the efficiency of the service, each president of a provincial board of health is sooner or later ordered to Manila on temporary duty, in order that he may gain experience in modern methods. While here he is required to observe the general work of a sanitary station, the methods of sanitary house and food inspection, and of disinfection, plague inoculation, treatment of plague and cholera houses, service of sanitary orders, diagnosis and removal of cases of infectious disease, and the destruction of rats in the prevention of plague; also to accompany the inspectors of plumbing and the officials of the pail conservancy system, and to observe the methods and appliances in use for the sanitary disposal of excreta. He is further given instruction in port quarantine and the methods of ship disinfection under the direction of the chief quarantine officer, and in clinical and post-mortem diagnoses of epidemic diseases of domestic live stock and meat by a veterinary surgeon at the city abattoir. He observes the methods employed at the serum laboratory in the preparation of serums and vaccine virus, and in inoculation against rinderpest; the operations of the city vaccinators; the management and equipment of the plague, cholera, smallpox, leper, and venereal hospitals, and of the morgue, the crematory, and the steam disinfecting plants; the treatment of those suffering from contagious diseases; the method of making post-mortem examinations and disposal of the dead; also the methods employed in the office of the secretary of the board of health in keeping records, securing vital statistics, and preparing reports.

Such temporary assignment to duty in Manila is of material advantage to the presidents of provincial boards of health. Were there some similar arrangement by which officers and employees now constantly on duty at Manila could be sent to the provinces to familiarize themselves with conditions there the efficiency of the service would be further increased and the recommendation of impracticable legislation relative to provincial and municipal sanitary matters would be largely avoided through a better understanding of local conditions.

COLLECTION AND DISPOSAL OF NIGHT SOIL.

This work has until recently been carried on in part by the board of health and in part by private contractors authorized by the city engineer. It is now performed by the city engineer under ordinances drafted by the board of health. As the city engineer's department was previously charged with the disposal of street refuse and garbage, the maintenance of two separate organizations for carrying on such closely associated lines of work was obviously illogical, and the transfer to this department of the work of collecting night soil has resulted in increased efficiency and economy. A systematic campaign has been conducted against insanitary water-closets, with the result that many foci of disease have been removed.

DIVISION OF DISINFECTORS.

Extended experience in dealing with contagious and infectious diseases in Manila has only served to emphasize the fundamental im-

prompt and thorough disinfection as the most effective [illegible] means of preventing their spread. A division of disinfection under a chief disinfector, has been organized and thoroughly [illegible]. Had such an organization existed at the beginning [illegible] it might have performed work of the utmost [illegible]

OVERCROWDING.

[illegible] which result from the overcrowding of [illegible] Manila and will necessarily continue until such [illegible] of the street-car line makes it feasible for the [illegible] to the outlying districts of the city and still get [illegible] at moderate cost. The city engineer will [illegible] the more insanitary houses in the congested [illegible] Filipino residents may be expected to take [illegible] thus afforded for living in a more comfortable [illegible] prefer to crowd together in the darkest [illegible] buildings in the city, and nothing but [illegible] ordinances will change their customs in this [illegible]

[illegible] AND FOOD INSPECTION.

[illegible] and wisely distributed markets which [illegible] American occupation are, as a rule, kept in [illegible] and their sanitary control is comparatively [illegible] however, some 1,200 tiendas in the city [illegible] They are a great convenience to the [illegible] be abolished, but it is a matter of difficulty [illegible] decent state. Doubtless the most dangerous [illegible] are those sold by itinerant venders. The new [illegible] being drafted by the board of health will deal [illegible] matter, and it is hoped that the character of [illegible] sold to the poorer classes may be materially improved without inflicting any serious hardship upon venders or purchasers.

OPIUM SMOKING ESTABLISHMENTS.

There are over 200 establishments in Manila where opium is smoked. They are filthy and insanitary and are at present not recognized by law nor required to take out licenses. The new sanitary code designates these places as "opium divans" and provides for their regulation. Upon this subject the commissioner of public health in his annual report says:

As long as there are Chinese in the Philippine Islands there will be opium smokers and opium smoking. If opium divans are permitted to exist the business can be forced out of cockpits and tiendas into the divans, where it can be so supervised and controlled as to reduce to a minimum the resulting evil effects now apparently on the increase. The board of health deplores the existence of such establishments; nevertheless they exist, and because they do exist, and will continue to exist, it would seem to be wiser to recognize them for what they are than to ignore them for sentimental reasons.

FREE DISPENSARIES AND FREE CLINICS.

Two new free dispensaries have been established in the more populous and poorer districts of the city during the past year, bringing



A DISINFECTING SQUAD OF THE BOARD OF HEALTH.

Photograph by Martin.



LANDING AT QUINTA MARKET.

Photograph by Martin.



QUINTA MARKET, MANILA.

Photograph by Martin.

the total number up to 3. Eleven thousand six hundred and sixty prescriptions have been filled, as against 6,658 for the previous year, showing that the poor people are gradually learning to appreciate the advantages of these institutions.

Free clinics are held daily at each of these dispensaries from 8 a. m. to 5 p. m. The number of patients treated at these clinics is steadily increasing and the medical and surgical work thus performed is of great value to the poor.

Bishop Brent, of the Protestant Episcopal Church, has established on Calle Magdalena, in the district of Trozo, a dispensary and clinic for the free treatment of all classes of disease, at which admirable work has been done. In view of the fact that sufficient funds for the continuance of this clinic were not available, and of the further fact that the persons who take advantage of it belong almost entirely to the poorer classes, the commissioner of public health was authorized by the undersigned to supply free of charge the medicines used, paying for the same from the fund for the purchase of medicines for indigent Filipinos. The bureau of government laboratories has also been directed to perform free of charge the chemical and biological work required by this institution in connection with the treatment of disease.

HOSPITALS FOR THE INSANE.

The situation as regards facilities for the care of the insane has become increasingly difficult during the past year. While much more has been done in this direction under American rule than was previously attempted, the fact that this class of unfortunates is being cared for at Manila has become generally known, with the result that very numerous applications to have insane persons cared for have been received. In many instances the patients in question are dangerously insane and are confined in provincial jails or in the houses of relatives or friends under such conditions as to make it highly desirable that they should, if practicable, be taken in charge by the government.

After the Hospicio de San José, where insane persons are cared for at government expense, had been filled to overflowing, increased facilities were obtained there through the kindness of Archbishop Harty, but the relief thus afforded was only temporary. There remained no alternative but to send to Bilibid Prison the more violent and dangerous of the insane for whom accommodations were sought, and to refuse to receive those whose condition was such as to render it practicable for local authorities to care for them.

The buildings on the La Lomboy estate, which is included in the friar-lands purchase, will be equipped for the care of the insane as soon as practicable after title to the property passes to the insular government. An appropriation for this purpose has already been made.

GENERAL HOSPITAL.

Little can be added to what has already been said as to the imperative need of a general hospital for civil officers and employees and for other residents of the city of Manila and the islands at large.

During the past year something has been accomplished looking to the establishment of such an institution. A general hospital committee, made up of government officials and of physicians, business men, and other interested citizens, has been appointed to secure plans for adequate buildings and estimates of the cost of erecting and equipping them and of conducting the proposed hospital. Plans for a modern pavilion hospital have been procured and will soon be transmitted to the Commission for consideration. The completion of the structures called for by these plans will involve the expenditure of a sum of money so large as to be beyond the present means of the government, but the plans are such that individual buildings can be constructed as the needs of the service may require and as funds become available. It is confidently believed that when the great need of such an institution and the enormous good which it would accomplish are realized in the United States, financial assistance may be secured from charitable persons there.

The undersigned is strongly of the opinion that the plans prepared should be adopted and the several buildings should be erected and equipped as rapidly as insular funds can be spared or private funds secured for this purpose. It is hoped that in the near future such buildings will be erected as will make it possible to care for all civil officers and employees now treated at the Civil Hospital and for a larger number of private patients than can at present be accommodated there.

A site for the general hospital has been selected on the exposition grounds, conveniently near the new building of the bureau of government laboratories, where all chemical and biological work for the hospital will be performed. The power plant of the laboratory building has been planned with a view to furnishing the power and electric light which the hospital will need. The exposition grounds were originally sufficiently extensive to allow of the establishment of the proposed hospital and of a medical school, but the recently effected purchase of a comparatively small triangular piece of land lying between these grounds and a proposed new boulevard 100 feet in width will give a fine frontage for the hospital buildings on what will be one of the best streets in Manila.

THE SAN LAZARO HOSPITALS.

The old San Lazaro Hospital, for the treatment of leprosy and venereal diseases, and the new smallpox, cholera, and bubonic-plague hospitals, which have been erected on the San Lazaro grounds during the past year, have been placed under one management and renamed "The San Lazaro Hospitals." The new buildings for the infectious-disease department are modern in every respect and afford greatly increased and improved facilities for the treatment of infectious diseases. The former unsuitable buildings were in part destroyed by fire in May, 1903. Those that remain are now used for breeding small animals needed in connection with the serum and other work of the bureau of government laboratories.

SAN JUAN DE DIOS HOSPITAL.

The work of this excellent institution, which is conducted by the Roman Catholic Church, may with propriety be referred to in this



CONTAGIOUS-DISEASE HOSPITALS AT SAN LAZARO, MANILA.

Photograph by Martin.

report, for the reason that the city of Manila has contracted with it for the care of 100 poor patients daily. The city poor are quick to avail themselves of the opportunity thus afforded, as is shown by the fact that the free wards are usually filled to the limit. A large amount of charitable work is also performed.

MUNICIPAL PHYSICIANS AND MIDWIVES.

There are in the city of Manila eight municipal physicians, selected by competitive examination, whose duty it is to render free medical assistance to the poor of the city. The board of health also employs one Spanish and seven Filipino midwives, whose duty it is to attend confinement cases occurring among the indigent. These midwives are supplied with antiseptic dressings and maternity bandages, the latter large enough to conserve the bodily heat and prevent chilling, which often results fatally with the naked babes of the poor.

By the opening of the doors of the Civil Hospital to patients of all classes, whether government employees or not, by providing further accommodations for the poor in San Juan de Dios Hospital, by the establishment of free dispensaries and numerous free clinics, and by the hiring of physicians and midwives to give free attendance to the poor, the insular and municipal governments are doing much to alleviate human misery in the city of Manila; in fact, more can hardly be done in this direction until increased facilities are afforded by the erection and equipment of new buildings.

BOARDS OF MEDICAL AND SURGICAL, PHARMACEUTICAL, AND DENTAL EXAMINERS.

Stringent provisions of law have been enacted to safeguard the practice of medicine and surgery, of pharmacy, and of dentistry, and a person desiring to practice any one of these professions in the Philippine Islands must first appear before a board of examiners and pass a satisfactory examination. During the year ending June 30, 1904, the board of medical examiners passed upon the qualifications of 44 candidates, of whom 15 were registered as doctors of medicine, 14 as licentiates of medicine, 14 as cirujanos ministrantes, and 1 as midwife. No pharmacists were examined. The board of dental examiners passed upon the qualifications of 3 candidates, all of whom were registered.

For further details relative to the work of the boards of medical, pharmaceutical, and dental examiners reference is made to their annual reports for the year ending June 30, 1904. (Appendixes B, C, and D, respectively.)

ENFORCEMENT OF SANITARY LAWS.

The courts of Manila and the city prosecuting attorney have been zealous in their enforcement of laws and ordinances relating to sanitation, and adequate punishment has been meted out to offenders regardless of their social position, wealth, or influence. This condition of affairs did not prevail in Manila prior to American occupation.

A very different condition of affairs exists in the provinces, where violators of sanitary ordinances are tried before municipal presidents. The latter, being elective officers, are apt to be swayed by the opinions

of their constituents, who are usually opposed to all sanitary ordinances, and it is often difficult to secure conviction of the grossest offenders. The bringing of pressure to bear by provincial or insular officers has, however, in many instances produced marked improvement in individual municipalities.

The commissioner of public health is of the opinion that a general law which would give to the board of health powers relative to provincial municipalities similar to those which it exercises in Manila should be passed, in order that a uniform set of sanitary ordinances, which in time would become generally known and respected, might be provided for provincial municipalities. While it would, of course, be easy to adopt a set of health ordinances applicable to all provincial municipalities, the undersigned is of the opinion that the time is far distant when such a set of ordinances can be made generally effective, and it is questionable whether in a given instance the absence of proper health ordinances is not better than the existence of an elaborate code which it is wholly impracticable to enforce.

BILIBID PRISON.

The death rate in Bilibid Prison for the past year has been 70.95 per thousand, as against 99 for the preceding year. This marked improvement has been obtained in spite of the fact that the number of prisoners has materially increased. The death rate is still high. Doubtless a high death rate is almost inevitable among ignorant criminals closely confined in the Tropics. A plan is under consideration for relieving the present crowded condition of Bilibid Prison by colonizing certain classes of prisoners on the island of Paragua, where they could lead a comparatively normal life, and where they might have their families with them and ultimately be assigned allotments of land. It is believed by the undersigned that if this plan were carried out it would not only greatly improve health conditions among the prisoners, but would lead to moral improvement as well.

WORK OF THE VETERINARY DIVISION.

There has been great improvement in the work of this division during the year. The authorized force has been increased from 1 veterinarian originally authorized to 15 veterinarians and 30 inoculators.

During the past year 94,303 animals were examined for disease at the time of their arrival in the city of Manila, and 89,299 were examined in the abattoir before slaughter. Nine hundred and seventy-one animals were condemned on account of disease, and their bodies disposed of by cremation.

The combating of rinderpest has, however, been the most important work of the veterinary division. Attempts to restock the islands with draft animals by importing carabaos from China have been attended with very heavy losses to the government. Efforts to check the spread of rinderpest among cattle native to the islands by simultaneous inoculation with antirinderpestic serum and the blood of diseased animals have been successful in practically every instance, and it has grown more and more evident that the best way to secure an adequate supply of draft animals is by protecting, through inoculation, the animals already here, together with their offspring.

At the outset the work of the veterinarians and inoculators in combating rinderpest was carried on in the face of grave difficulties. The Filipinos expected them to bring a medicine which would cure sick animals, and when it was observed that they took blood from sick animals and injected it into well ones the fear at once arose that they were endeavoring to spread the disease rather than to check it. In more than one instance the hostility thus aroused was so great that it was deemed advisable to abandon inoculation entirely, and in many cases operations were rendered ineffective by the driving off to the mountains of a considerable number of animals which should have been presented for treatment. Gradually, however, the Filipinos have learned by experience that the inoculation protects their cattle from rinderpest at the expense of a very insignificant loss. As a result, telegraphic appeals for help now come in from all parts of the archipelago more rapidly than they can be acceded to. More veterinarians are therefore being brought from the United States.

Shortly after a force of inoculators arrives on the scene of an epidemic of rinderpest the disease is checked, and it becomes impossible to secure virulent blood for use in simultaneous inoculation. The remaining animals are then given serum inoculation, which confers temporary immunity, and the inoculators are ordered elsewhere. It has now been demonstrated that even animals which have contracted rinderpest can often be saved by intravenous injections of serum.

OFFICE OF THE COMMISSIONER OF PUBLIC HEALTH.

The health service of the islands suffered a grievous loss during the past year through the illness and consequent resignation of Dr. Edward L. Munson, captain and assistant surgeon, U. S. Army, assistant to the commissioner of public health, who served as acting commissioner of public health during the absence of the commissioner while engaged on the work of the Opium Commission and at other times. Doctor Munson was a zealous, able, and efficient servant of the government. By overwork he sacrificed his health to the cause of sanitary science in the Philippine Islands, and the loss to the service which resulted from his necessary return to the United States was greatly felt.

The satisfactory results which have attended the work of the board of health during the period covered by this report have been largely due to the able direction of Dr. E. C. Carter, major and surgeon, U. S. Army, commissioner of public health. It was expected at the time of Major Carter's detail that the islands would have the benefit of his services for a period of two years only. The change in regulations relative to the tropical service of staff officers keeps him here for another year. What he may perhaps regard as his personal loss is a very distinct gain to the health service of these islands. To his unusual qualifications for the position of commissioner of public health he has now added two years of practical experience, and the time when his services will of necessity be lost to the insular government is looked forward to by the undersigned with regret and with no little concern.

His report for the year ending August 31, 1904 (Appendix A), describes in much greater detail than has been practicable for any

previous year the work of the board of health, and those who desire more detailed information on this subject are referred to it.

THE QUARANTINE SERVICE.

Heavy responsibility has devolved upon the quarantine service from the fact that the islands have been practically surrounded by countries in which quarantinable diseases were present in epidemic or endemic form. Cholera has occurred in ports along the entire eastern coast of Asia from Japan to the Straits Settlements. Bubonic plague has prevailed in epidemic form in Formosa and Australia. Hongkong has for many years been a center of bubonic plague, and during very recent times has been visited yearly by cholera. Vessels arrive from this port almost daily, bringing numerous passengers and large quantities of food stuffs, and great care has been necessary to prevent the introduction of disease.

The business of these islands is largely maritime, and any incumbrances placed upon shipping are promptly and severely felt, but under the able direction of Dr. Victor G. Heiser, passed assistant surgeon, chief quarantine officer for the Philippine Islands, difficulties have been successfully met and quarantinable disease has been excluded from the islands with very little interruption to the normal course of business. The beneficial results arising from the enforcement of sanitary measures on vessels are becoming so well known that in many instances masters themselves request that their ships be disinfected or fumigated.

The character of the work performed by the Philippine quarantine service is now so well known throughout the civilized world that a vessel holding a good health certificate from these islands is granted unconditional pratique in all ports. Japan has recently granted the same privileges to vessels coming from Philippine quarantine stations that she extends to those which have passed the Japanese quarantine.

The work at Jolo was particularly heavy during the past year, Asst. Surg. H. A. Stansfield, who at the time he was placed in charge of it had been in the islands more than three years performing duties of a very arduous character, broke down completely under the strain and was succeeded by Asst. Surg. William F. Lewis.

VESSELS BOARDED.

Three thousand eight hundred and eighty-two vessels were boarded at the port of Manila, and 7,783 at the other three ports of entry at which quarantine officers are stationed. The chief of the quarantine service states that the number of vessels inspected is larger than in any other territory of equal size, and that a quarantine officer in the Philippines gains in a few months as much experience as does an officer on duty in the United States in as many years.

One hundred and fifty-six vessels were disinfected at the Manila station and 36 at other stations; 41 because quarantinable diseases were found on board, and the remainder because they came from infected ports or were infected with rinderpest or other cattle diseases.

Five hundred and fifty-seven vessels were fumigated with sulphur to kill rats and other vermin. The chief of the quarantine service states that never before in the same length of time have so many ves-

sels been treated by any quarantine service. Fumigation for the destruction of rats is most useful apart from its direct relationship to the communication of disease. Vermin propagate much more rapidly in tropical than in temperate climates, and this is especially true on board vessels, so that unless remedial measures are taken with a reasonable degree of frequency great discomfort to passengers results.

BUBONIC PLAGUE.

The work of the board of health in reducing the number of cases of bubonic plague during the year has been ably supplemented by that of the quarantine service in preventing the introduction of new cases. There is no reason to believe that a single case of plague has been imported. Vessels plying between Hongkong and other infected ports and Manila are thoroughly fumigated at least twice a year, and oftener if they have been in dry dock, as plague-infected rats are especially likely to come on board when they are in dry dock. It is probable that one important factor in the success which has been attained in keeping out plague is the fact that foreign vessels, up to the present time, have been compelled by the absence of wharves to unload into lighters. When the new port works are completed greater precautions will be necessary in order to prevent the introduction of plague by vermin escaping from vessels from infected ports.

SMALLPOX.

Smallpox continues to be the disease most frequently met with by quarantine officers, and 17 vessels infected with it were disinfected during the year.

The quarantine service has cooperated with the board of health in the matter of vaccinations, especially in the case of crews of vessels. Eighteen thousand seven hundred and seventy-three members of ships' crews were vaccinated during the year. These vaccinations were very successful; at Manila, for instance, out of 11,399 persons vaccinated it is known that there were 6,502 "takes." There were probably many more, but as a considerable portion of those vaccinated did not again come under the observation of the quarantine officers the exact number can not be stated.

LEPROSY.

Leprosy was detected on six vessels during the year.

AID TO OTHER SERVICES.

There were 878 physical examinations made of masters, mates, patrons, engineers, and other ships' officers at the request of the collector of customs, 99 of the persons examined being rejected. For the immigration service 6,252 persons were examined, and 472 rejected. A number of special physical examinations were made at the request of the Philippine civil-service board, and at the request of the Army, transports were inspected at Mariveles instead of at Manila.

QUARANTINE STATION AT CEBU.

Thirty thousand dollars, United States currency, were appropriated by Act No. 831 for the erection of a quarantine station at Cebu. The

board of officers appointed to select a site chose the island of Cauit, in the harbor of Cebu, about a mile below the port. When this action became known a claimant appeared for the land, as is usually the case when it appears that land supposed to belong to the government is valuable and likely to be made use of. The case was decided in the court of land registration in favor of the government. It was then appealed to the court of first instance, but has since been settled out of court, and construction of this new station will begin immediately.

ADDITIONAL LAUNCH.

The additional launch for the quarantine service, authorized on August 12, 1903, and contracted for in San Francisco, failed to come up to specifications in the matter of speed and ability to go out in heavy weather, and was not accepted. Steps are now being taken to secure a proper launch elsewhere.

INTERISLAND QUARANTINE SERVICE.

Inspection of vessels at ports of entry has been controlled by the regular quarantine service; that at other ports has been in charge of the board of health for the Philippine Islands. When infected vessels have been encountered by board of health employees they have been sent, if practicable, to the nearest quarantine station for treatment. So long as cholera continued a rigorous inspection was maintained throughout the islands. After it disappeared inspection was for the most part discontinued except at ports of entry, where it has been maintained not only to protect the islands from importation of disease, but to keep check on the sanitary condition of vessels engaged in the coastwise trade. Nearly all such vessels sooner or later call at ports of entry.

Every effort has been made to inspect incoming vessels promptly, and the launch service has been so arranged that a vessel can be inspected at any time during the working hours of the day within a few minutes after its arrival.

For further details and statistics of the work of the quarantine service during the past year, reference is made to the report of the chief quarantine officer (Appendix E), who by his thorough familiarity with the work in hand and his close attention to details has saved the insular government considerable sums without in any way impairing the efficiency of the service, which in the opinion of the undersigned is higher to-day than it has ever been before.

PHILIPPINE CIVIL HOSPITAL.

The work of the civil hospital during the past year has continued to be of a highly satisfactory character. Several bitter attacks have been made on this institution in the local press, but careful investigation has failed to show any improper conduct or failure to perform duty on the part of any officer or employee of the institution. The Commission showed its appreciation of the character of the services rendered by the attending physician and surgeon in charge by raising his salary on January 1, 1904, at a time when very few increases in salary were being made, and those only upon the strongest of showings.

The taking effect of the new leave law, under which time spent in the hospital is charged to vacation leave instead of to sick leave, has materially decreased the attendance.

The unprecedented flood which invaded Manila on July 13, 1904, was followed by an extraordinary increase in the number of cases of amœbic dysentery. More than fifty persons suffering from this disease were at one time under treatment in the civil hospital, and practically every bed in that institution was filled for a number of weeks. The frequent attention required by dysentery patients, coupled with the fact that at this time one of the nurses was on detail at the civil sanitarium, Baguio, Benguet, and others were on leave of absence, threw an almost intolerable burden of work upon those who remained, but they responded nobly to the demands made upon their time and strength until additional help could be secured and the situation relieved.

Amœbic dysentery continues to be the most troublesome ailment with which American employees in the Philippines are afflicted. During the year ending August 31, 1903, 77 cases of this disease were treated at the civil hospital, with 3 deaths. During the present year 253 cases have been treated, with but 3 deaths. Two hundred and thirty of these cases were treated by the hospital staff and the remainder by private physicians. A large number of civil officers and employees suffering from this disease did not report at the hospital, but were treated by private physicians at their homes. While the mortality in dysentery cases at the civil hospital has been very low, amounting to only about 1 per cent, a considerable number of patients have ultimately left the islands temporarily or permanently in order thoroughly to regain their health.

Amœbic dysentery is far better understood now than during the early days of American occupation. Most cases, if taken promptly, yield quite readily to treatment, but cases of long standing often prove very refractory. It is therefore of great importance that an early diagnosis should be made, and, as this is readily possible with the aid of the microscope, the attending physician and surgeon has with the approval of the undersigned, recently addressed a circular letter to the chiefs of all bureaus calling attention to the necessity of having all cases of incipient bowel trouble among their employees promptly diagnosed by the bureau of laboratories. When samples are transmitted through the attending physician and surgeon to the bureau of laboratories, a microscopic examination is made free of charge, and therefore there is no excuse for any employee delaying definitely to ascertain the cause of intestinal troubles from which he may be suffering.

The total number of cases treated at the civil hospital during the year was as follows: Medical—Males, 1,244; females, 195. Surgical—Males, 420; females, 65.

Forty-seven of the patients treated at the hospital died. Of these 14 were the patients of private physicians. This gives a mortality of 1.86 per cent for patients treated by the hospital staff. Of the 33 deceased patients thus treated 13 were in a dying condition upon admission. If these are deducted, the death rate was 1.13 per cent. This rate, which is extremely low for a hospital in a tropical country, is in itself sufficient answer to the adverse criticisms which have been

to have made relative to the care of patien

number of persons admitted to the hospi
Civil employees, pay patients, 9
free patients, 165; private patients, 286; em
of the patients treated 1,325 were Americans a
were Europeans, 6 were Indians, 2 were Hindoos, 10
Chinese.

Drugs and medical supplies to the value of ₱57
for the use of civil employees o
Eight thousand one hundred and ninety
filled and 14,200 visits were made by patien
attending physician and surgeon, who also mad
The total number of surgical dressings perf
amounted to 400.

TRAINING OF FILIPINO NURSES.

Three Filipino women have been employed recently i
and the attending physician and surgeon expres
appreciation at the adaptability and faithfulness w
displayed. There is no room for doubt as to the urgen
a suitable hospital training school for Filipino nurses, but i
that this can be done in the present cramped quarte
the present hospital.

MATERNITY WARD.

The need of more liberal accommodations in the mate
especially great. The consequence is at times such
as putting three or more mothers with young babies in
temporary cubicle would be afforded by the removal of
laboratories to the new building at the rear of gover
which will in the [illegible] every building av
with the present work [illegible] low, and he
become afflicted [illegible] of the difficul
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[illegible] SYNGUE

from time to time made relative to the care of patients at the civil hospital.

The total number of persons admitted to the hospital was 1,909, divided as follows: Civil employees, pay patients, 996; civil employees, free patients, 465; private patients, 286; emergency cases, 162. Of the patients treated 1,325 were Americans and Europeans, 560 were Filipinos, 6 were Indians, 2 were Hindoos, 10 were Japanese, and 6 were Chinese.

Medicines and medical supplies to the value of ₱577.01 were furnished to other bureaus for the use of civil employees on duty outside of Manila. Eight thousand one hundred and ninety-one prescriptions were filled, and 12,900 visits were made by patients to the office of the attending physician and surgeon, who also made 3,650 outside calls. The total number of surgical dressings performed in the dressing room was 8,400.

TRAINING OF FILIPINO NURSES.

Three Filipino women have been employed recently in the women's ward, and the attending physician and surgeon expresses himself as greatly surprised at the adaptability and faithfulness which they have displayed. There is no room for doubt as to the urgent necessity for establishing a training school for Filipino nurses, but it is not apparent that this can be done in the present cramped quarters occupied by the civil hospital.

MATERNITY WARD.

The need of increased accommodations in the maternity ward is especially great. The congestion there is at times such as to necessitate putting three or more mothers with young babies in a single room. Temporary relief will be afforded by the removal of the chemical laboratory to the new building of the bureau of government laboratories, which will make the old laboratory building available in connection with hospital work, but it is small, low, and hot, and will by no means afford a satisfactory solution of the difficulty, which can only be met by the erection of a modern building on a good site, well removed from low, undrained, mosquito-breeding grounds, such as adjoin the present civil hospital.

Further details as to the work of the civil hospital may be found in the report of the attending physician and surgeon for the year ending August 31, 1904. (Appendix F.)

THE CIVIL SANITARIUM, BAGUIO, BENGUET.

During the last months of the dry season of the present year the civil sanitarium at Baguio, Benguet, was made more accessible than ever before by the completion of the new Benguet road to Camp 4 and the construction of a horse trail from that point to the Igorrote settlement of Loacan, from which place the upper section of the Benguet road, constructed several years since, gives easy access to Baguio. As a result, the attendance during these months was exceptionally large. During the stay of the Commission at Baguio, from the 15th of April to the 15th of June, every available bed was constantly filled, and many applicants were necessarily refused admission. A number

of patients, who were directed by their physicians to go to Baguio immediately or leave the islands, were compelled to adopt the latter course.

The 20-room addition, which was authorized in 1903 by resolution of the Commission, has not yet been constructed, for the reason that sufficient lumber could not be secured, the small amount available having been used for the completion of three of the government cottages, for the erection of a temporary office building, and for barracks for servants and laborers. No adequate quarters have heretofore been available for the latter class of employees, who have at times suffered considerable hardship.

An appropriation has now been made for the addition to the sanitarium of some 23 rooms for patients and boarders, together with an outside kitchen and other necessary outbuildings, and it is hoped that this addition can be completed before the coming dry season, so that better accommodations may be furnished than have been heretofore available.

By resolution of the Commission, dated May 30, 1904, a pesthouse at Baguio was authorized. It will be erected at the end of the present rainy season, when lumber and labor are available.

Less difficulty was experienced during the year than heretofore in securing food. A considerable quantity of fresh vegetables was furnished by the agricultural station at Trinidad. The supply might readily have been made to exceed the demand had the necessity for irrigation at this station during the dry season been called to the attention of the undersigned promptly enough to allow of the construction of irrigation ditches before dry weather had seriously injured or killed many of the vegetables which should have been ready for use during the closing months of the dry season. As the entire tract of land occupied by this station can now be irrigated, there should be no further shortage of fresh vegetables, experience having shown that practically all the vegetables of the Temperate Zone can be successfully raised in the Trinidad Valley.

ATTENDANCE.

One hundred and fifty government officers, employees, and members of their families, and 20 private servants were accommodated at the sanitarium during the year. These figures do not include the occupants of the sanitarium cottages. Heretofore the sanitarium at Baguio has been practically deserted during the rainy season. This year, however, although the rains have been unusually heavy, the number of persons other than the employees of the institution staying there has not been less than ten during any week. Transportation difficulties still render it hard for any but fairly healthy persons to reach Baguio, and a large proportion of those who make use of the sanitarium are not patients, but are persons seeking change of climate and rest.

Seventy-four actual hospital patients have been treated during the year, of which number 37 were Americans, 7 Filipinos, and 30 Igorrotes. Of these 33 were cured, 31 improved, 8 unimproved, and 3 died. This list does not include persons who were temporarily ill while living or boarding at the sanitarium, those treated at their homes by the attending physician and surgeon, or the relatively

large number who called at the office of the attending physician and surgeon for treatment, but lived outside the sanitarium. The latter class are enumerated by the attending physician and surgeon in his report under the heading, "Outdoor department." The work of this department was originally built up by Doctor Thomas, the present attending physician and surgeon, and was resumed by him on his return from the United States in December. During the seven months ending August 31, 1904, 301 persons were treated at the dispensary or at their homes. Of these 98 were Americans, 90 Filipinos, 94 Igorrotes, and 19 Japanese. Eight surgical operations were performed, and 335 revisits and 183 vaccinations were made. The relatively large number of Igorrote patients treated in the outdoor department is of interest. It is but a short time since the only remedy believed by the Benguet Igorrotes to be efficacious in the treatment of disease was a feast, at which pigs, chickens, or cattle were sacrificed. They are now coming to appreciate the efficacy of the white man's remedies and to take advantage of the opportunity to secure them.

DISEASES AT BAGUIO.

Further experience goes to prove that patients suffering from anemia, nervous exhaustion, obstinate dyspepsia, and other intestinal diseases derive great benefit from the cool and stimulating climate of Baguio, but such patients should prepare to remain there at least a month, and probably two months, if they hope to be permanently cured. Troubles of this sort can not be cured in a few days in any climate.

Beriberi.—There has been a small outbreak of beriberi among the prisoners at the provincial jail at Baguio and among the constabulary stationed there. The disease was undoubtedly imported from the Benguet road, where it has prevailed to some extent among the laborers. It was of a mild type and has yielded readily to treatment in most cases.

Bronchitis.—Bronchitis is quite prevalent among the native inhabitants of Baguio during January and February as well as during the rainy season. Insufficient clothing and shelter account for most of the cases.

Dysentery.—Dysentery is common among the native inhabitants at the beginning of the rainy season, and is frequently contracted by Americans at this time, particularly by newcomers who have not become acclimated. The disease is of the simple catarrhal variety, usually accompanied by slight fever, with little if any pain. It is ordinarily self-limiting and disappears after a few days of rest and proper diet. Cases with considerable hemorrhage frequently clear up completely within a week, thus showing the characteristics of an acute congestion rather than of a specific disease.

Absence of amœbic dysentery.—No well-authenticated case of amœbic dysentery contracted at Baguio has ever occurred. Microscopic examinations of many persons suffering from catarrhal dysentery have recently been made and amœbæ have never been found in any case that was known to have had its origin at Baguio. During the past dry season amœbæ were demonstrated in two of the surface springs at Baguio, and later, during the rainy season, in two other



A GOVERNMENT COTTAGE AT BAGUIO, BENGUET.

Photograph by Worcester.

springs from which the natives are accustomed to drink. As a consequence, circulars were issued warning all residents to boil their water, but in view of the fact that no case of amœbic dysentery has ever yet originated among civil employees or other Americans living in or near Baguio, although most of them take no precautions as to the sterilization of their drinking water, and in view of the further fact that this disease is thus far unknown among the Igorrote inhabitants of this region, it is at least doubtful whether the amœbæ found were of the dysentery-producing variety. Persons treated at the sanitarium between March 1 and August 31, 1904, in whose stools amœbæ were found, were in every instance patients transferred for treatment from Manila or other lowland towns.

Of the civil officers and employees who spent the latter part of the dry season at Baguio five were found to be suffering from amœbic dysentery shortly after their return to Manila. One of these persons, who refused to have a microscopic examination made while at Baguio, was in all probability suffering from the disease at the time she went there. All the others had had abundant time to contract the disease after their return to Manila before it was detected. Several of them suffered from intestinal disturbances while at Baguio, but unfortunately microscopic examinations were not made.

With a view to determining the question of whether or not amœbic dysentery may originate at Baguio the attending physician and surgeon has been directed to make careful microscopic examination in every case of intestinal disorder coming under his care.

It is an interesting fact that repeated examinations have failed to reveal the presence of amœbæ of any sort in the beautiful spring which forms one of the sources of the Bued River and from which Baguio will ultimately be supplied with drinking water.

Tuberculosis.—During two years of practice in and about Baguio the attending physician and surgeon has never yet observed a case of pulmonary tuberculosis among the native Igorrotes or Ilocanos. Americans suffering from tuberculosis who have been sent temporarily to Baguio have shown quite rapid improvement, but none of them have remained there long enough to make it possible to determine the ultimate effect of permanent residence there on persons suffering from this disease. It is the opinion of the attending physician and surgeon that no special provision need be made at Baguio for Americans with tuberculosis, for the reason that such persons should in any event return to the United States, as the climate of the lowlands is particularly favorable to the development of this disease, although if the patient is already greatly reduced, so that the voyage across the Pacific might prove disastrous, it would be well to send him to Baguio for a sufficient length of time to allow him to recuperate.

With Filipinos, however, the case is very different. Tuberculosis is the chief cause of death among adults at Manila, and is quite prevalent throughout the islands. It is doubtful if any Filipino suffering from this disease would care to take up his residence in any other country, especially when there is a region in the Philippines with a climate such as to afford good hope of recovery. In the opinion of the undersigned a settlement for tuberculosis patients should ultimately be established on some sunny and sheltered site well removed from Baguio, so that it might be possible for Filipinos to take up their residence there until restored to health.

WEATHER.

The highest temperature registered at the weather station at Baguio during the year was 77.7° F., on April 5, 1904, and the lowest was 49.8° F., on January 6, 1904. The highest monthly average or mean maximum temperature was 74.1° F., for April, 1904, and the lowest monthly mean minimum temperature was 52.5° F., for February, 1904.

The severe drought of last year has been followed by extraordinary rains, the rainfall for the twelve months reaching the phenomenal total of 195.56 inches, as compared with 96.29 inches for the same period in 1900–1901. The highest monthly rainfall was 54.92 inches, in July, 1904, and the lowest 0.81 inch, in March, 1904. On October 26, 1903, there occurred a veritable deluge, 19.82 inches of water falling in twenty-four hours.

NEW HOSPITAL BUILDINGS RECOMMENDED.

The attending physician and surgeon renews and emphasizes his recommendation of last year that a new hospital on the pavilion plan be erected at Baguio, and gives, with much detail, his views as to the number, size, and character of the buildings needed; as to their orientation, ventilation, and heating, and as to the materials which should be used in their construction. The unsuitableness of the present sanitarium building for the purposes to which it is now put is too well known to require comment. With the proposed addition it will make a fair boarding house for civil officers and employees, but it is unfit for use as a hospital building. However, the rooms in the proposed addition will be more sunny and dry than are those in the present structure. The recommendation of the attending physician and surgeon relative to the erection of proper hospital buildings, constructed on the pavilion plan, at such time as improved transportation facilities have brought the cost of construction within reasonable limits, is heartily concurred in by the undersigned.

SANITARIUM STABLE.

The sanitarium stable which was begun last year was not completed until April, 1904. It furnishes good accommodation for 43 native ponies. The rental of ponies was a source of considerable income during the busy season. The demands of patients and guests led to a material increase in the number of ponies kept. Supervision was exercised over the stable by a hospital steward who had numerous other duties, with the result that ponies were sometimes improperly cared for or neglected, and that persons who used them occasionally abused them without being called to task for such improper conduct or compelled to pay for injury to them. With a view to remedying this difficulty an American employee has been engaged to look after the stable.

The necessity for good stables at Baguio has been demonstrated during the recent heavy rains, which caused no loss among sanitarium ponies, but are known to have killed 16 out of one small herd in the Trinidad Valley.

SUPERINTENDENT AUTHORIZED.

During the busy season the sanitarium was both a hotel and a hospital. The attending physician and surgeon was compelled to run a livery stable, meet the endless difficulties involved in securing subsistence supplies, provide transportation for patients and guests on the trail, give medical attendance to the sick in the sanitarium and in the vicinity of Baguio, and exercise general supervision over the sanitarium grounds and cottages. It was obviously well-nigh impossible for any one man satisfactorily to discharge such numerous and varied duties. With a view to preventing a similar condition of affairs during the coming busy season, provision has been made for a superintendent from and after January 1, 1905, who will attend to the hotel features of the work and will look after transportation.

For further details of the work of the civil sanitarium, and for a particularly interesting and instructive account of the diseases which have been found to occur among the native inhabitants of Baguio and its vicinity, reference is made to the annual report of the attending physician and surgeon for the year ending August 31, 1904. (Appendix G.)

BUREAU OF FORESTRY.

Up to May of the present year the operations of the bureau of forestry were conducted in accordance with the provisions of General Orders, No. 92, series of 1900, issued by the military governor. Act No. 1148, entitled "The forest act," which embodies the results of four years of practical experience in Philippine forest work, was enacted May 7, 1904. In drafting it the chief of the bureau had the benefit of many valuable suggestions from Mr. Gifford Pinchot, Chief of the United States Bureau of Forestry. It is hoped that the provisions of the new forest act will result in stimulating the lumber industry in these islands, and at the same time in protecting and actually improving the public forests. By this act the tariff charged on different forest products was reduced 25 to 60 per cent. Native woods were rearranged in four groups instead of five, as heretofore, and the term "superior group," which had been constantly confounded with "first group," was abolished. The provinces were divided into two classes, namely, those with abundant forests and those where forests are becoming scarce; and the tariff fixed for the former class was half that prescribed for the latter.

The granting of exclusive licenses covering definite tracts of land for periods up to twenty years was provided for, thus rendering it practicable for lumbering companies to install adequate plants with the certainty that they will be able to control extensive tracts of forest land for a sufficient period to justify the investment of considerable sums in machinery, animals, etc.

EXHIBIT AT THE LOUISIANA PURCHASE EXPOSITION.

Much time was given during the early part of the year to preparing and shipping the Philippine forestry exhibit at the Louisiana Purchase Exposition. Serious transportation difficulties were encountered in the provinces. The workshop of the bureau, which had been recently established, was without woodworking machinery or fine oils

or varnishes, all of which had been seasonably ordered from the United States but had not been received. A creditable exhibit was, however, prepared.

A forest map of the entire archipelago, measuring 16 by 13 feet, on a scale of 6 miles to the inch, was made by the draftsman of the bureau and sent to St. Louis, while a copy, half the size of the original, was retained for the office of the chief of the bureau. Forest maps of five forest districts, comprising the provinces of Bataan, Zambales, Tayabas, Ambos Camarines, Mindoro, and Masbate, were also completed. They show the limits of the tract of public forest granted to each holder of a timber license in these provinces. Wall maps of nine other provinces were made in less detail.

NEW QUARTERS.

New and commodious quarters have been assigned to the bureau in the Oriente Building.

ADDITIONAL EMPLOYEES.

The authorized working force of the bureau has been increased by one civil engineer, one inspector, four assistant inspectors, one clerk, and one skilled workman. An improved system of inspection and increased experience on the part of officers and employees of the bureau have materially added to the efficiency of the service.

COLLECTIONS ON FOREST PRODUCTS.

The total collections on forest products for the year amount to $599,480.58, Mexican currency, as against $527,414.85 for the previous year.

DIVISION OF FOREST MANAGEMENT.

During the first half year the work of the division of forest management was mainly confined to the examination of forest areas assigned to different licensees in the provinces of Zambales, Bataan, Tayabas, Ambos Camarines, and Masbate, and to the marking of timber for felling within these areas. The system of marking all timber to be felled is being extended as rapidly as practicable, and is of great importance in preserving the more valuable tree species from extinction over wide areas and in the improvement of the forests by properly directed cutting.

LICENSES.

While local forest officers are authorized to grant ordinary timber licenses for amounts not exceeding 13 cubic meters, as well as gratuitous licenses to needy residents, and firewood licenses, all applications for the taking of forest products in large amounts are forwarded to the Manila office by local forest officers, together with their recommendations. Applications sent direct to the Manila office by applicants are referred to local forest officers for recommendation before action is taken thereon. In issuing licenses old licensees who are residents of the municipalities within which they desire to cut are given first consideration. New applicants living in the municipality which they

desire to cut come next; then old licensees who are residents of the province but not of the municipality in which they desire to cut; and finally, new residents of the province. In this way an attempt is made to favor actual residents and persons who can personally supervise forest operations.

All applications made in the five forest districts of Bataan, Zambales, Ambos Camarines, North Tayabas, South Tayabas, and Masbate were forwarded to Manila by the local forest officers with their recommendations. Many more applications for license were received than during any previous year since American occupation. All licensees were allowed four months from the dates of their licenses in which to commence operations. A number of licenses were canceled for failure to comply with this provision.

Owing to the destruction by wind and fire of a number of towns, there was a noticeable increase in the number of gratuitous licenses granted to needy residents for lumber to rebuild their houses. A total of 2,390 licenses for the taking of forest products were granted to private individuals, under which there were taken 4,458,235 cubic feet of timber, 230.417 cubic meters of firewood, 6,749 cubic meters of charcoal, 10,419,786 pounds of dyewood, 396,369 pounds of tanbark, 1,791,086 pounds of dammar, 50,856 pounds of gutta-percha, 8,593 pounds of india rubber, 266,821 pounds of resins, balsams, and allied products, 88,364 liters of oils, 149,058 pounds of beeswax, 370,746 pounds of rattan, 882 liters of honey, 2,505 stakes for fish corrals, 2,345 orchids, and 427 cubic meters of wood for shoes, on all of which the regular charges were paid. There were also taken under gratuitous license 364,755 cubic meters of timber, 124,888 cubic meters of firewood, and 7,955 pounds of tanbark.

Nineteen timber licenses were granted to companies. The amount of timber cut under these licenses was 458,327 cubic meters.

LAMAO FOREST RESERVE.

Work was begun by the bureau of forestry at Lamao, province of Bataan, in August, 1903, and on July 26, 1904, the Lamao Forest Reserve, including an area extending from the seashore to the summit of Mariveles Mountain, was set aside by proclamation of the civil governor. Three nurseries have already been started on this reserve. Type areas have also been established, and the more important trees within these areas have been identified and numbered. Roads have been constructed and three camps have been built, the lowest at sea level and the highest at an elevation of 2,400 feet. A field party of four persons is at present mapping the reserve and is showing the location of all land within it claimed by private persons, in order that such claims may be adjudicated by the court of land registration. A botanical survey of the reserve has been planned and is being carried out through cooperation between employees of the bureau of government laboratories and of the bureau of forestry.

The Lamao Forest Reserve, with its well-organized camps and good roads and trails, extending, as it does, from the sea beach, with its characteristic flora, through forest-covered lowlands and up foothills and mountain slopes to the cloud-draped summit of Mariveles Mountain, with stunted trees buried in moss and covered with countless

orchids, affords opportunities for visiting botanists which can not be equaled elsewhere in the Philippines, and can hardly be excelled anywhere. The location is healthful and the heat is moderate at sea level, while the higher mountain slopes are very cool. Visitors desiring to study the flora of the Lamao reserve will be given every opportunity to do so, and will be allowed to make their headquarters at any one of the permanent camps.

Exchanges of seeds and plants from the Lamao reserve are being made with a number of botanical gardens in the Far East, and new plants, some of which seem likely to prove of economic value, have been introduced. Mangoes, cocoanuts, bananas, and pineapples were found growing on the reserve without cultivation. Large areas have now been planted with selected varieties of bananas and pineapples, and considerable numbers of seedlings of papaya, orange, lemon, anona, cocoanut, chico, cashew nut, and other fruit-bearing trees of less importance have been put out. Five thousand mango seedlings have also been planted. Experiments are being conducted with native oranges and lemons with a view to improving their quality.

Thirty-seven varieties of native timber trees, 32 varieties of foreign timber trees, 17 species of native ornamental trees, 18 species of imported ornamental trees, 46 species of native ornamental plants and flowers, 21 species of imported ornamental plants and flowers, 28 species of native fruits, 22 species of imported fruits, 12 miscellaneous plants and native vegetables, and 16 species of forage plants, fiber-producing plants, and imported vegetables are already planted and growing.

At an elevation of 2,000 feet wild raspberries were found in abundance. At this point a tract of land has been cleared and several acres planted in deciduous fruits, coffee, and the best varieties of California oranges and lemons. Teosinte is being grown in order to furnish forage for the animals used on the reserve, a crop of 30 tons of fodder having been secured from the first cutting on 1 acre of land, while eight successive cuttings were obtained from trial plats during the year.

Analyses of the soils from each of the three stations have been made by the bureau of government laboratories.

After visiting and thoroughly inspecting this reserve, the undersigned is impressed with the fact that a vast amount of valuable work has been accomplished there at very small expense, and that Lamao, which can be easily and quickly reached by water from Manila, will, in the near future, become a point of great interest not only to technical forest and botanical workers, but to a large number of other persons who will desire to enjoy beautiful tropical forest scenery without undergoing the hardships which such enjoyment usually involves.

TIMBER-TESTING LABORATORY AND WORKSHOP.

During the first half of the year the time of the employees of the timber-testing laboratory and workshop was largely devoted to the preparation of the forest exhibit for the Louisiana Purchase Exposition. Owing to the nonarrival of machinery, practically everything had to be done by hand. When this exhibit had been shipped regular work was resumed.

Prior to April 22, 1904, 150 timber tests, covering 82 different species, were made. Since that time the work of the laboratory has been under the supervision of Mr. Rolland Gardner, who has made 113 tests of 58 kinds of woods, 46 of these tests being made on 13 different species of woods from Borneo. Detailed results of these tests will be found in the report of the chief of the bureau of forestry. (Appendix H.)

A small number of samples only of each kind of wood have thus far been tested, and results are only approximate. A more systematic series of tests has recently been inaugurated on 100 specimens, measuring 6 feet by 4½ by 4½ inches, of each of the six leading native construction woods.

Although more than 700 different species of native woods have been brought into the Manila market during the past year, fully 75 per cent of the total amount marketed belonged to 37 of these species. Many very valuable woods can not be sold to-day in the Manila market, because their properties are not well known. The tests made in the timber-testing laboratory, and the practical demonstrations of the value of these woods afforded by their employment in the workshop for the construction of handsome furniture, are of great value in promoting their use. Sets of wood samples taken from more than 80 of the more important tree species have been prepared for distribution to scientific and other institutions.

A fairly complete set of wood-working machines was received from the United States in February and installed in the workshop. Since that time a large amount of cabinetwork in the way of renovating and polishing old furniture has been performed. Under proper methods of filling and polishing the beauties of the native Philippine woods have been brought out for the first time. There has been a rapid increase in the receipts from work done in this shop, and it would be possible to place it on a paying basis in a short time. The Commission has decided, however, to transfer this branch of the work to Bilibid prison, in order to secure a better supply of labor for the shop and at the same time to teach convicts a useful trade, which they can follow after their release and which would yield them returns sufficiently good to take away the temptation to steal in order to secure a livelihood.

For further details relative to the work of the bureau of forestry for the year ending August 31, 1904, and for a series of fine illustrations showing Philippine forest scenes, reference is made to the report of the chief of the bureau. (Appendix H.)

THE MINING BUREAU.

A reorganization of the mining bureau, in order to make possible the carrying on of active field work, was effected by the passage of Act No. 916, effective October 15, 1903.

Mr. Charles H. Burritt, the first chief of the bureau, was appointed a judge of first instance prior to the time this act took effect, and Mr. H. D. McCaskey, who had previously held the position of mining engineer in the bureau and who had served as its acting chief during the absence of Mr. Burritt, was made chief.

The functions of the mining bureau as reorganized are—

to make, facilitate, and encourage special studies of the mineral resources, mineral industries, and geology of the Philippine Islands; to collect statistics con-

cerning the occurrence of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make collections of typical geological and mineralogical specimens, especially those of economic and commercial importance, such collections to constitute the museum of the mining bureau, subject, however, to transfer by executive order of the civil governor to any general museum established; to provide a library of books, reports, drawings, etc., bearing upon the mineral industries, the sciences of mineralogy and geology, and the arts of mining and metallurgy, such library constituting the library of the mining bureau; to make a collection of models, drawings, and descriptions of mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections and library as to make them available for reference and examination, and open to public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of the Philippine Islands; to make an annual report to the secretary of the interior setting forth the important results of the work of the bureau, such special reports as may be called for by proper authority, and such bulletins concerning the statistics and technology of the mining industries, and of the geological and mineralogical and other office and field work of the bureau, as may be approved by the chief of the bureau and ordered published by the secretary of the interior.

To the end that this work might be carried out, the appointment of two geologists, two field assistants, and the temporary services of such assistance from mining engineers, experts, practical miners, and others as the funds appropriated for the field work of the bureau might warrant, together with an adequate clerical force, was authorized. It will be seen that the functions of the bureau as reorganized approximate more nearly to those of a State mining bureau in the United States than to those of the Federal Geological Survey, and the chief aim of the bureau as reorganized is to secure and disseminate reliable information relative to the mineral wealth of the islands, the methods likely to prove successful in its development, and the work actually in progress.

ASSAY WORK TRANSFERRED.

The first fire assaying subsequent to the cession of the Philippines to the United States was carried on by the mining bureau; subsequently, pursuant to the established policy of having all chemical work performed in a central chemical laboratory, fire assaying was transferred to the bureau of government laboratories. In the inadequate quarters heretofore occupied by the chemical laboratory it has been impracticable to provide suitable facilities for this work. In the new and thoroughly equipped building to which the chemical laboratory is now being transferred there is a room provided with all modern appliances for fire assay work and with facilities for crushing and grinding rock. The cost of grinding and firing ore samples will be greatly reduced by the use of proper machinery—a large furnace and an electric smelter—so that a material reduction in the fees charged for custom work is possible. It is believed that every need of miners, prospectors, mill men, and smelter men can now be satisfactorily met without sending samples to the United States. Blowpipe and petrographic microscopical mineral and rock determinations will be made in the future, as in the past, by the mining bureau.

ADMINISTRATION OF MINING GRANTS TRANSFERRED.

Pursuant to the policy of leaving the mining bureau free to carry on field work and to study the materials thus obtained, the records

and archives pertaining to so-called Spanish mining grants and mining claims, as well as the administration of such grants and claims, were transferred to the bureau of public lands by Act No. 915, passed October 1, 1903. All land-office business pertaining to mining claims was thus placed where it properly belongs.

NEW QUARTERS NEEDED FOR THE BUREAU.

The mining bureau is at present quartered in five rooms in the old Spanish mint building. They are inadequate for the present working force and are not sufficiently well lighted to permit a proper display of the mineral collections. It is believed, however, that no attempt should be made again to move the bureau until it can be transferred to permanent quarters, and that satisfactory quarters for the mineral museum can be obtained only by construction. The plans originally prepared for the new building of the bureau of government laboratories contemplated the ultimate erection of two wings, one of which should accommodate the bureau of agriculture and the bureau of forestry, and the other the mining bureau and the bureau of public lands. Good quarters have now been provided for the bureau of agriculture and the bureau of forestry in the Oriente Building. The bureau of public lands is, like the mining bureau, still very inadequately housed, and the Commercial Museum already more than fills the space allotted to it in the Oriente Building. The necessity for the provision of additional museum space will become imperative upon the return from the St. Louis Exposition of certain of the valuable collections which have been sent there, and it is believed that when the condition of the insular finances will justify the necessary expenditure proper space should be provided for a general museum and for the mining bureau and the bureau of public lands by the construction of one of the two proposed wings of the building of the bureau of government laboratories. So far as the mining bureau is concerned, this arrangement would be peculiarly happy, for its mineralogical collections could then go where they belong—in a well-lighted museum open to the public—and would still be conveniently accessible to the officers and employees of the bureau, while the immediate proximity of the chemical laboratory, where the assay work is done, and of the general scientific library would still further facilitate the work of the bureau.

ADDITIONS TO COLLECTIONS.

Extensive and valuable additions have been made to the mineral collections during the past year. The present chief of the bureau purchased, while on leave in the United States, a good working collection of typical specimens, consisting of 350 pieces representing the more important minerals, especially those entering into the composition of rocks; 200 pieces representing ores and minerals of economic interest, 225 rock specimens, and 250 specimens of fossils, particularly those of the Tertiary and Quaternary periods. This working collection is of great practical value, both to the officers and employees of the bureau and to miners and prospectors. Large additions have also been made as a result of the field work of the bureau, more especially from the province of Lepanto and the island of

Mindoro. Numerous samples of ores, coals, rocks, guanos, and a few fossils have been contributed by miners, prospectors, and other friends of the bureau. Special mention should be made of a collection of 28 samples of gold, iron, and manganese ores from the island of Masbate, presented by Mr. Heise.

With a view to showing the mineral resources of the Philippines these collections are conspicuously displayed, one case being devoted entirely to coal, another to old ores, a third to copper, lead, and iron ores, and a fourth to clays suitable for the manufacture of bricks and pottery, to limestone and natural cement, and to building stone, all from the Philippines. Tools and models showin the methods of Igorrote copper metallurgy in Lepanto, and of Tagalog iron-smelting operations in Bulacan, are also on exhibition.

ACTIVE FIELD WORK BEGUN.

Although the provisions of act No. 916, reorganizing the mining bureau, became effective October 15, 1903, some time necessarily elapsed before the new positions created could be filled and the first field party organized. Mr. A. J. Eveland, the geologist who was to take charge of this party, arrived from the United States in January, and as soon as funds had been made available by the passage of the semiannual appropriation bill the party left for southern Lepanto, to undertake a systematic investigation of the Mancayan-Suyoc district, where are found the largest copper deposits yet discovered in the Philippines, as well as considerable deposits of gold-bearing ore. The party remained in the field until June 22, when rains made further field work impracticable. In fact, for three weeks prior to its return the party worked in rain a part of every day.

Apart from mapping and careful investigation of the country in the vicinity of Mancayan and Suyoc, this party made a route survey from Candon, Ilocos Sur, to Suyoc, by way of Tilad Pass, and another route survey from San Fernando, Unión, to Baguio, Benguet.

A large series of rock samples and ores was secured. They are now being worked up by employees of the bureau of laboratories and of the mining bureau. The results of the trip will be published as soon as practicable.

Messrs. Eveland and Ickis also investigated the gold placer deposits at the junction of the San Mateo and Novaliches road and the Novaliches River, discovering placer platinum at this point. This is the first discovery of platinum in the Philippine Islands, and although it has not yet been found in sufficient amount to be of commercial importance, the fact of its occurrence is noteworthy.

The chief of the bureau has examined the coal deposits in the mountains east of San Mateo, in the province of Rizal, but the seams observed were not of sufficient thickness for profitable work, and the coal was found by analysis to contain 35 per cent of ash. Although these seams are unimportant, good lignite occurs in large amounts near the towns of Boso-Boso and Antipolo, in the same province.

During the month of April, 1904, the chief of the bureau was invited to accompany an exploring expedition fitted out from the Twelfth Cavalry, at Camp McGrath, Batangas, for the purpose of crossing Mindoro from Baco, on the east coast, to Santa Cruz, on the west coast, and of seeking such information as might be obtainable



CRATER OF TAAL VOLCANO DURING ERUPTION OF 1904.

Photograph by Squires and Bingham.

concerning the people, resources, and conditions in the interior of this hitherto unexplored portion of Mindoro. The party landed at Baco on April 2, following the Baco River for about 12 miles in bancas and proceeding on foot from the point thus reached, along the north arm of the river, known as Alog, until a series of gorges and precipices were encountered which made further progress impossible. They then struck across one of the northern spurs of Mount Halcon, reaching at one time an altitude of 3,200 feet, struck the head waters of the Bagajan River on the west slope of this spur, and followed this river to the west coast.

The party slept on the ground, under 8-ounce shelter tents, and subsisted on hardtack, bacon, canned stew, and coffee. The trip was one of much hardship, there being no roads or trails through the forest. Rain fell in torrents during the entire time spent in the forests of the divide, and on one occasion the party had a narrow escape from losing its baggage and even some of its members through the extraordinarily rapid rise of a mountain stream. On the high western slopes of the divide rock exposures showed a great thickness of crystallized limestone, much of it in the form of fine white marble and of slates. Serpentine was found as float, as was bornite, a valuable copper ore. Streams were panned for platinum, placer gold, and tin, but none of these metals were found. The rocks encountered were in general metamorphic and apparently of considerable age. Volcanic rocks were found only on the west coast. Route surveys were made from coast to coast by Lieutenants Beck and Mayo, and the chief of the mining bureau is only awaiting copies of the maps resulting from these surveys to complete his report on this trip.

The chief of the bureau also visited Taal Volcano during a period of unusual activity in July, for the purpose of collecting material for study and of outlining plans for future work in connection with this interesting center of seismic disturbance.

FUTURE FIELD WORK.

It is planned in the near future, as soon as cessation of rains makes field work possible, to undertake a detailed investigation of the mineral resources of the province of Benguet, and to examine the coal deposits on the island of Bataan and the gold-bearing gravel deposits of Masbate.

The collection of statistics and general information concerning the mineral resources of the islands and their development will be continued by Mr. Morris Goodman, field assistant of the bureau, and special attention will be given to gathering information concerning clays for brick and pottery, limes, natural cements, and building stones. The study of the stratified economic deposits of the islands, with particular reference to the development of iron and coal, must await the appointment of another geologist, which it is hoped can be made in the immediate future.

PRESENT STATUS OF MINING.

Substantial progress has been made toward the development of Philippine mineral deposits during the past year. Active operations are now being carried on in Lepanto-Bontoc, Benguet, Bulacan,

Rizal, Tayabas, Ambos Camarines, Albay, Mindoro, Cebu, and Mindanao. At Suyoc and Mancayan, in southern Lepanto, assessment and development work is being performed on a larger scale than at any time since American occupation. Transportation difficulties have been very great in this region. It is hoped that they may be diminished during the coming year by the construction of a one-day trail over Malaya Mountain to Tagudin, on the coast. The time at present occupied in going over the Tilad Pass to the coast is three days.

Much more important work has been done in Benguet than in Lepanto. Mr. James Kelly has persistently developed a promising gold lode near Antomok, and has now gone to the United States for the purpose, it is understood, of purchasing a complete stamp mill to work his ore, which is very rich. A little farther south Messrs. Peterson and Clyde are developing a gold claim in a business-like manner, and are contemplating the establishment of a stamp mill, with dam, flume, and a turbine power plant. The Philippine Gold Mining, Power, and Development Company are developing five gold claims some 4 miles from Kias, and have recently imported and shipped to their mines a 10-stamp Hendy mill, with a Woodbury concentrator, a Blake crusher, a Pelton water wheel, capable of operating 60 stamps, and an assay equipment complete. This plant will be transported over the Benguet road to Kias. The government has authorized its owners to use Igorrote laborers from the road to transport it from Kias to their mill site, they agreeing to pay the wages of the laborers while so occupied and to give the government the use of their plant for any investigation of Benguet ores which it may desire to make.

For some time Mr. Hartwell has been operating his claim near Kias at a profit, with a 3-stamp mill built by himself in a Manila machine shop. This is the first stamp mill ever erected and operated in the Philippine Islands.

Other gold claims are being developed in Benguet and several of them give good promise of proving profitable.

Copper has also been discovered in this province. A number of copper claims have been located and recorded, and assessment work has been done upon them. Many of the copper ores of Benguet and Lepanto carry gold.

The extremely rich and pure iron deposits of the Angat region in Bulacan have been worked in a small way, as heretofore, by native miners, who display great ingenuity in smelting on a small scale and in the casting of plowshares and points. These valuable deposits should in the near future be developed on a large scale. The extension of the Cabanatuan branch of the Manila and Dagupan Railroad will considerably simplify the transportation problem involved in getting charcoal or coke to Angat and in shipping iron and iron ore. The ore is rich enough to justify its shipment to Japan, where, it is understood, there would be a good demand for it.

A number of placer claims have been located and worked to the north and west of the towns of Montalban and San Mateo, in the province of Rizal.

Twenty-two petroleum locations and other claims have been recorded in the province of Tayabas.

Valuable concessions granted by Spain in the gold districts of Paracale and Mambulao, in Ambos Camarines have not been worked,



INTERIOR OF HARTWELL'S STAMP MILL, KIAS, BENGUET.



HARTWELL'S STAMP MILL, KIAS, BENGUET.

owing to difficulties encountered by the claimants in securing capital. The time for the legal performance of labor has been once extended, but is now rapidly drawing to a close, and there appears to be no authority of law for a further extension. It is understood that capital has now been secured by the claimants, and they may, perhaps, be able to perform the necessary work before the time limit expires. It is certainly to be hoped that the present claimants or other persons may in the near future develop the rich deposits of Paracale and Mambulao to the extent they seem to deserve.

In Albay Province Gil Brothers are reported to be developing a coal mine on the island of Bataan, in five seams, each 1 meter thick, using a force of Spanish and Japanese miners and securing a good grade of lignite. A Japanese engineer who examined their "Bilbao" mine estimates that when fully opened up it should be able to produce a thousand tons of coal per day. On the southwestern peninsula of this island, which is reserved for military purposes, Lieut. H. L. Wigmore, Corps of Engineers, U. S. Army, assisted by a detail of men, is making a thorough examination of coal deposits by means of the diamond drill. This coal has been found by actual experiment to be suitable for use on steamers.

In Masbate much prospecting, assessment and development work has been done, particularly at Arroroy, on the north coast, where three companies have been working. One of these concerns has had completed in San Francisco a modern dredging plant for bringing up sea gravel, and has ordered a stamp mill for crushing its free-milling ores. The prospects for opening up profitable mines here seem very good.

In Cebu there has been some prospecting and location of coal deposits, but no real development work seems to have been carried on within the past year. There appears to be no good reason why the valuable coal deposits on this island should not be developed.

In Mindanao a handful of miners have been working the gold fields of Placer and Surigao. Most of the work performed has been in the nature of prospecting. The island is being gradually but somewhat extensively explored.

There have been reported as located during the fiscal year ended June 30, 1904, 209 lode claims and 109 placer claims, making a total of 318. These claims were divided as follows:

Gold	132
Silver	1
Copper	11
Petroleum	22
Coal	8
Guano	23
Stone	8
Iron	3
Lead	3
Not specified	107
Total	318

In addition to mining work proper, the allied industries are yearly becoming of greater importance. Brick and pottery are being made by Filipinos in a large number of provinces and in steadily increasing quantity. The Filipinos are also burning limestone for lime and quarrying rock for building and other purposes.

the affairs of civil government in the Philippine Islands, and for other purposes," which provides that "no holder shall be entitled to hold in his, its, or their own name, or in the name of any other person, corporation, or association more than one mineral claim on the same vein or lode." The undersigned has twice called attention, in previous reports, to the harmful operation of this provision, and can not refrain from again urgently recommending that the necessary steps be taken to secure from Congress the repeal of this section, concerning which the chief of the mining bureau, in his report for the year ending August 31, 1904, says:

> This most unfortunate section will naturally operate against the development of any but the richest lodes, and in the Philippines, as in mining districts the world over, the bonanzas are few and the deposits of low-grade ores relatively large. In Lepanto and Benguet, as well as in the Camarines, Masbate, and Mindanao, there are important deposits that should be worked upon a large scale and which under section 33 can never be worked at all. It is safe to say that under section 33 neither the famous Homestake nor the Alaska Treadwell mines would ever have been developed, and yet these are among the greatest gold producers known. The ore of the Homestake mines in South Dakota averages only $4 and that of the Alaska Treadwell only $2 to the ton, yet these mines being able to handle immense bodies of ore, are among the best paying and soundest mines in the world. The former requires 900 stamps, yielding a monthly output of $373,000 of gold, and the latter employs 540 stamps, paying $130,000 a month.
>
> The low-grade ore deposits in the Philippines are so extensive and valuable that section 33 tends to operate as an obstacle to the development of the greater part of our metalliferous resources.

The sentiment of persons engaged or interested in mining in the Philippine Islands is unanimous in favor of the repeal of this section. The chief of the mining bureau, the secretary of the interior, the civil governor, and the Philippine Commission have heretofore urged its repeal. The incorporation of further recommendations on this subject in this annual report of the Commission is suggested. It is certainly to be hoped that favorable action by Congress upon this important matter may not be longer delayed.

MINERALS OF THE PHILIPPINES.

A mineral map of the Philippines, showing the locations of known or reliably reported mineral deposits of economic value, has been prepared. This map is being kept carefully up to date by entering upon it all new information obtained.

The valuable minerals thus far found in the Philippines are gold, copper, lead, silver, platinum, zinc, tin, manganese, iron, mercury, antimony, coal, sulphur, petroleum, salt, gypsum, limestone (including marbles), clays (including kaolin), and building stone.

A deposit of stream tin has been reported at Alfonso XIII, on the west coast of Paragua, and there is good reason to believe that cinnabar and native mercury have been found on Mount Isarog, in Ambos Camarines. Reports of their occurrence in Panay have proved false.

Many of the minerals mentioned in the above list have not yet been found in paying quantities.

The only precious stones thus far reliably reported are opals from Binangonan, province of Rizal, and some very small rubies from the headwaters of streams which reach the ocean near Mambulao and Paracale, in Ambos Camarines.

For further details relative to the work of the mining bureau for the past year and for a concise and reliable statement relative to the occurrence in the Philippine Islands of each of the minerals mentioned in this report reference is made to the report of the chief of the mining bureau for the year ending August 31, 1904 (Appendix I).

BUREAU OF GOVERNMENT LABORATORIES.

NEW BUILDING.

With the completion of its building the bureau of government laboratories will enter upon a new era. In September, 1901, this bureau had no quarters and practically no equipment, the very limited amount of biological and chemical apparatus and materials which had been inherited from the old municipal laboratory of Manila being stored in a basement room of the civil hospital.

The overcrowding of the city of Manila at this time rendered it extremely difficult to rent buildings of any sort. As a result of this fact and in view of the desirability of having the laboratory building near the civil hospital, the bureau was at the outset necessarily housed in a small, low, and somwhat dilapidated building of the class usually referred to in Manila as a "shack," situated immediately behind the civil hospital. As laboratory work increased and new equipment and additional supplies were added, various nondescript additions were made to this building in order to furnish the space imperatively needed. It was eventually devoted exclusively to chemical, photographic, and botanical work, and the remainder of the biological work, the pathological collections, and the technical library were transferred to a large dwelling house on Calle Alix. Both of these buildings lacked power, and the latter one was without that sine qua non of laboratory work—gas. The chemical laboratory building was almost surrounded by low, flooded lands and was intolerably hot, which probably accounts for the poor health of many of the employees who work in it.

A year ago it was hoped that the new building would be ready for occupancy on July 1, 1904. This hope was not realized. Prior to September 1, however, it was practicable to transfer to it the officers and employees of the biological laboratory; also the technical library, the botanical and pathological collections and the contents of the laboratory storehouses. Before October 1 the entire working force and equipment of the chemical laboratory will have been transferred. Gas machine and gas tanks are in place; a donkey engine which temporarily supplies water is in operation, and the main boilers and vacuum pump are in position. The engines and dynamos are now being set up, but the starting of the engines must await the arrival of an iron stack for the chimney, which had to be secured from Singapore and was ordered very late. A considerable amount of plumbing work, and of carpenter's work on shelving and laboratory desks, remains to be done. It is hoped that all work on the main building will be completed and that the machinery will be in operation by December 1.

Stables for serum horses and vaccine calves, and the small animal houses, which will be located a short distance away from the main



OLD BUILDING OF THE BUREAU OF GOVERNMENT LABORATORIES.

Photograph by Martin.



NEW BUILDING OF THE BUREAU OF GOVERNMENT LABORATORIES.

Photograph by Martin.

building, for hygienic reasons, have not yet been constructed, but work upon them will begin at once.

The wisdom of giving a large amount of time to the preparation of the plans for this building has been demonstrated by the fact that it has not been necessary to change them in any important detail, and by the further fact that the several rooms are proving perfectly satisfactory for the purposes for which they were designed. The construction materials used were chiefly cement and expanded metal, so that the danger from fire is reduced to a minimum. In order still further to reduce it a powerful fire pump, operated by steam from the boilers, and an adequate supply of fire hose have been installed. Coolness and good ventilation have been secured to a degree which will insure to laboratory employees a more comfortable place in which to do their work than can be found elsewhere in Manila.

All laboratory desks are supplied with water and gas connections, and, where needed, with electrical, steam, and vacuum connections as well. The library is equipped with steel book-stacks.

While all of the rooms in the building will be occupied from the outset, the space allotted to each of the several branches of work is such as to allow a material increase in the number of employees without overcrowding. The power plant will be available at night to supply electricity for light or power to other buildings now on the exposition grounds or which may hereafter be erected there. Space has been left for the installation of an additional boiler, should it be needed later.

It is now for the first time feasible to perform work involving the use of a considerable amount of power, or of steam, or of vacuum, and to conduct operations in vacuum extraction, drying and distillation upon a commercial scale, so that the narrow limitations within which the work of the bureau has heretofore been held by the lack of these very necessary facilities are removed. No one not familiar with the details of laboratory work can appreciate the stimulus which will be afforded to employees by the change from the overcrowded, badly ventilated, poorly lighted, and generally unsatisfactory structures in which they have heretofore been housed, to this comfortable, thoroughly equipped building, carefully planned to meet the special needs of the several branches of biological, chemical, and serum work.

VISITING SCIENTISTS.

The bureau has already been fortunate in securing the services of two thoroughly trained visiting scientists, whose work it will publish in return for such facilities as it has been able to furnish them. With the new building completed, the coming of other visitors who will desire to carry on scientific work of practical value to the islands is assured.

POSSIBLE OUTSIDE ASSISTANCE.

As the chemical work of the bureau will be largely associated with the practical development of the plant products and mineral wealth of the islands, in which business men are very directly interested, it seems by no means impossible that support in the way of grants for the carrying out of special researches, or contributions of money to

make possible the gathering of raw material, may be secured for the bureau, as they have been for so many university laboratories in the United States. The present interest in the study of tropical medicine, which has increased greatly within the past few years, might well justify the contribution of funds for adding to the already exceptional facilities for this study here by increasing the scientific library or by paying the traveling and living expenses of visiting investigators. The marine biological station at Naples is, to a considerable extent, supported by subscriptions from colleges and universities throughout the world, these institutions gaining the privilege of placing one or more students in the laboratory in return for their assistance. The bureau of government laboratories at Manila, with its present facilities, is an institution to which universities could subscribe with as much justness and as great advantage as they now do to the biological station at Naples. This matter will be seriously taken up with American universities by the superintendent of government laboratories while on leave in the United States.

LIBRARY.

The growth of the library has been steady and satisfactory, although it has been found impossible up to the present time to secure a number of the most important sets of periodicals. The expenditure of fixed sums for books has been authorized from time to time by resolution of the Commission, it being deemed inadvisable to appropriate funds for this purpose in advance in view of the long time which usually elapses after placing an order before it is filled in whole or in part. Uncertainty as to the cost of books ordered has rendered it necessary to leave a wide margin of safety in placing orders, and owing to this fact and to the further fact that a number of books ordered have not been obtained considerable sums appropriated for the purchase of books have lapsed at the close of fiscal years. With a view to the simplification of accounting, it is proposed to cancel all orders which are not filled prior to January 1, 1905, and to place new ones, requesting at the proper time the appropriation of unexpended portions of back appropriations which have lapsed. One semiannual appropriation of $7,650 remains to be made in order to complete the sum agreed upon for the purchase of books. Meanwhile the character of the library as originally planned has undergone material change. The original list of books was chiefly biological and chemical, and among biological books medical works were given a very important place. With the transfer to the bureau of government laboratories of the botanists of the bureau of agriculture and those of the bureau of forestry the botanical libraries of these bureaus were likewise transferred. Requests on the part of officers of other scientific bureaus for authorization to purchase books already in this library or ordered for it have been met by the adoption of rules under which officers and employees of such bureaus can make use of its facilities. The new building has an admirable reading room and excellent facilities for the storage and care of books, while a trained librarian and stenographer catalogues, arranges, and cares for them.

Experience has shown that small collections of books scattered among the separate bureaus are often exposed to injury by dampness, mold, and insects through lack of proper care, and that sets of peri-

odicals are incomplete owing to loss of individual numbers. In order to avoid these difficulties and to have one place where all scientific books and periodicals are catalogued, the undersigned has determined to convert the library of the bureau of government laboratories into a general technical library for the bureaus of the department of the interior and to transfer to it all of the books and publications of the several bureaus. Such books as are required for constant reference by any bureau may be drawn by its chief, but the librarian of the bureau of government laboratories will from time to time check them up and examine their condition, for which the persons signing for them will be held responsible. Current periodicals will be kept in the reading room, where they can be used by a larger number of persons than is the case when they are scattered through numerous bureau offices. The loss of individual numbers can then be avoided. Economy will be secured by making impossible the needless duplication of books. The usefulness of the library will be greatly increased by the existence of a comfortable reading room, which will be open in the evening.

With a view to carrying out the policy above outlined, the commissioner of public health, the chief of the bureau of forestry, the chief of the bureau of agriculture, the chief of the mining bureau, and the chief of the ethnological survey have been requested to furnish the superintendent of government laboratories lists of the books most urgently needed by them in connection with their work, to the end that the unexpended balance of funds for the purchase of books may be employed as wisely as possible. The transfer of the several bureau libraries will be directed as rapidly as books can be catalogued and shelved in the new building.

Many gifts to the technical library have been received during the past year, and it is hoped that they may be increasingly frequent in the future.

OFFICE OF THE SUPERINTENDENT.

To the great satisfaction of the entire force of laboratory officers and employees, the superintendent of government laboratories, Dr. Paul C. Freer, has finally severed his connection with the University of Michigan, which had gradually extended his leave for a total period of three years in the effort to retain his services, and has permanently entered the service of the insular government. It would have been very unfortunate if, after having planned and supervised the construction and equipment of the new building and having organized the bureau and brought it to its present high state of efficiency, he had not remained to direct its work. During the past year his time has been almost entirely given to the administrative work involved in supervising the construction and equipment of the building, accounting for the rapidly increasing volume of property of the bureau, editing publications, and planning and supervising the work of subordinates. As the new building is now practically completed, and as the Commission has relieved him of further property responsibility by authorizing a bonded property clerk, it is believed that upon his return from leave in the United States he will be able to give a large amount of time to research.

SERUM LABORATORY.

Until July 1, 1904, the serum laboratory was under the able direction of Dr. James W. Jobling, who resigned on that date in order to undertake a course of study in the United States and in Europe, extending over a period of two or more years. It is largely through Doctor Jobling's efforts that the serum laboratory has been brought to its present high state of efficiency. His loss is greatly regretted, and it is hoped that he may reenter the service at some future time. His place was taken by Dr. Paul G. Woolley, formerly of the biological laboratory, who had been previously transferred to the serum laboratory in order that he might obtain the necessary preliminary training to fit him to act as its director.

As heretofore, the preparation of antirinderpestic serum and of vaccine virus have constituted the bulk of the work of this laboratory; but diphtheria, plague, and tetanus antitoxins have also been made as occasion required.

Work of the director.—During the past year Doctor Jobling has demonstrated the fact that Texas fever, or so-called tick fever, exists not only in these islands, but in China, to such an extent that most of the native and imported Chinese animals, while themselves immune to the disease, are capable of communicating it. The importation of nonimmune cattle for breeding, dairy, or draft purposes is therefore certain to end in disaster through their contracting Texas fever. Doctor Jobling's original suggestion that Texas fever might be widespread in these islands was received with incredulity, if not with derision, by most of his scientific colleagues, but the thoroughness with which he demonstrated the fact left no room for further discussion.

Until March 1, 1904, the veterinary surgeons and inoculators of the board of health carried on the work of inoculating against rinderpest in the provinces under the director of the serum laboratory. On that date the veterinary corps was reorganized as a division of the board of health, and all of its work is now, as it should be, in charge of that board, while the laboratory furnishes the necessary serum.

In addition to his other duties the director of the serum laboratory had charge of the health of all carabaos imported from Shanghai during the latter part of the year 1903 and the first months of the year 1904. The appearance of surra among these animals after the disappearance of hemorrhagic septicemia added greatly to his already heavy burden of work and responsibility until the sending of all imported cattle to the island of Burias, which was free from surra, was determined upon.

Surra among carabaos.—Long-continued and careful observation carried on by the force of the serum laboratory has demonstrated the fact that surra is very fatal to carabaos when herded together, but that when individual carabaos suffering from it are well isolated, properly fed, and moderately worked they in most instances soon come into good condition. Whether or not they ultimately recover from the disease completely, or whether they continue to harbor the parasites at all times and are thus a constant source of danger to healthy animals, can only be determined after a greater length of time has elapsed.

Cure of rinderpest.—Experiments made at the serum laboratory on animals which had already contracted rinderpest by injecting in-

travenously from 115 to 500 c. c. of serum resulted in saving most of the animals taken in the early stages of the disease and in demonstrating the curative properties of this serum, the prophylactic properties of which have long been known.

Antiplague serum.—Death from surra of all the serum horses has temporarily put a stop to the production of this serum during the past year. Six animals are, however, being rapidly brought up to the bleeding point, and it is hoped that in the new fly-proof stables soon to be built it may prove possible to protect the serum horses from this disease.

Preparation of vaccine virus.—Experience in the preparation of vaccine virus has proved that it is not wise to attempt to make this prophylactic during the hottest season in the present temporary quarters at San Lazaro. Although extra precautions were taken to make the temporary stable as cool as practicable, a large percentage of the virus obtained during April and May was of inferior quality. The new vaccine stable at the main laboratory will be of a permanent character and will be so constructed as to give the best possible results.

Lack of opportunity for research.—Because of the steadily increasing demand for antirinderpest serum and vaccine virus, practically all of the time of the serum laboratory force has been given to the care of animals and the preparation of serums, and none has been left for research work. As the science of serumtherapy is still in its infancy, and as there is opportunity for great improvement in the methods of producing many of the sera already known, this fact is to be regretted. In no other line of work are the government and the people likely to derive more benefit from painstaking investigation.

Difficulty in securing employees.—Better salaries must be paid to the men engaged in serum work if the services of competent persons are to be secured and retained. The importance of this work is now so generally recognized in the United States that large salaries are readily obtained there by those who are competent to undertake it. Diligent and long-continued efforts to secure a competent assistant director of the serum laboratory at a salary of $2,250, begun by the undersigned and continued by the civil-service board, the chief of the bureau of insular affairs, and the superintendent of government laboratories, ended in failure.

Changes in equipment.—Few additions or improvements to the temporary buildings of the serum laboratory on the San Lazaro estate have been made during the past year, because it was known that the work involving the use of calves and horses would soon be transferred to the new laboratory building, leaving at San Lazaro only the rinderpest cattle and the small animals kept for breeding purposes. The presence of rinderpest serum cattle in the immediate vicinity of the San Lazaro hospitals is not unnaturally objected to by the commissioner of public health. Their transfer to ground near the new laboratory building would be desirable, but does not seem at present practicable on account of the heavy expense involved.

Small animals successfully bred.—Difficulties formerly encountered in breeding small animals, which were imported from China and Japan at heavy expense, have been overcome for the present, and Guinea pigs, rabbits, and white rats and mice are now being bred

successfully. It seems probable that the laboratory will be able in future to raise an adequate supply of small animals, but the possibility of losing the entire collection through epidemic disease is ever present in a tropical country.

BOTANICAL WORK.

During the past year the botanical work carried on for different bureaus of the government, and more especially for the bureau of forestry and the bureau of agriculture, has been expanded and improved. A systematic botanist, Doctor Copeland, and two botanical collectors, Doctor Whitford and Mr. Elmer, were added to the previous force. They have all proved to be very efficient field and laboratory workers, and the botanical collections have rapidly increased. Five thousand nine hundred and twenty-eight specimens were added to the herbarium; of these 218 were foreign and the remainder were from the Philippines. While a knowledge of the systematic botany of the islands and a good herbarium collection are necessary as a basis for botanical work, results of the greatest practical importance must be sought along other than systematic lines. Doctor Copeland and Doctor Whitford will soon take up physiological and other work, leaving Mr. Merrill and Mr. Elmer to continue the work in systematic botany, so that the growth of the herbarium during the next year will probably be less rapid than heretofore. A considerable amount of the material collected can now be identified in these islands, but it will ultimately be necessary to send some one to the herbaria of Europe to work up plants which it is impossible to determine here on account of lack of literature and of accurately identified specimens for comparison. As soon as sufficient funds are available the botanical force should be strengthened by the addition of a plant pathologist. Results of far-reaching practical importance have been obtained in the United States from the careful study of plant diseases, and there is no reason why similar results may not be obtained here.

BIOLOGICAL LABORATORY.

Owing largely to the absence of the undersigned, the understanding reached with Dr. Richard P. Strong, director of the biological laboratory, relative to the terms of his employment upon his return from Germany was not immediately carried out, and Doctor Strong at one time seriously considered the advisability of resigning his position. Fortunately for the biological laboratory, he decided to remain for the present as its director. The salary of this position was originally fixed at $3,500 per annum. This was a nominal sum, for the reason that Doctor Strong was at that time in the Army and did not receive compensation from the insular government for his services while on detail. The salary has now been fixed at $5,000 per annum, a sum fully justified by the importance of the position and the well-known ability of its present incumbent.

Clinical work.—During the past year clinical work in the diagnosis of disease has quadrupled. An average of 103 examinations per working day has been maintained, and this has left very little time for the carrying on of original investigation.

The force of the biological laboratory has been strengthened by the addition of Dr. Maximilian Herzog, a pathologist, who, in addition to a large amount of autopsy work, has already completed two important bulletins and has a third nearly ready for the press.

Pathological museum.—The valuable pathological museum has steadily increased. In the limited space heretofore available it has not been possible properly to classify and arrange the specimens, but in the new building space adequate to meet present needs is available.

Special investigations.—Doctor Musgrave and Mr. Clegg have carried on very important work during the year on the occurrence of amœbæ in the city water and in other waters used for drinking purposes. Chemical analyses and bacteriological counts of the city water have long been made at fairly regular intervals, but neither of these kinds of examination would have revealed the very dangerous quality of unboiled city water for drinking purposes, for the reason that during the past year this water has been chemically and bacteriologically very good. The examinations of Doctor Musgrave and Mr. Clegg have, however, conclusively demonstrated the abundant and continuous presence of amœbæ in it. These amœbæ have been isolated and through them amœbic dysentery has been communicated to monkeys, so that their pathogenic nature has been conclusively demonstrated.

While a large part of the study of diseases of cattle during the first half of the year was carried on under the direction of the serum laboratory, nearly all the diagnostic work on cattle was performed by the biological laboratory. This has sometimes necessitated sending members of its force into the field. The laboratory is now equipped with travelers' microscopes, the compactness, lightness, and strength of which make it possible to carry on diagnostic work in the field to the best advantage.

ENTOMOLOGICAL WORK.

The entomologist, Mr. Webb, after spending but a short time in the Philippines, resigned his position and returned to the United States without having accomplished results of any practical value. Mr. Schultze, who was appointed to the position thus vacated, has already done a large amount of valuable work in the collection and study of insects which attack cocoanut trees, and is carrying on important investigations on the breeding and rearing of butterflies and moths, with a view to the production of silk of a marketable quality from larvæ able to feed on the leaves of trees native to the islands.

The other entomologist, Mr. Charles S. Banks, was ordered to the United States on March 17 to install the entomological exhibit at the Louisiana Purchase Exposition and to identify material which could not be satisfactorily determined here. Mr. Banks subsequently applied by cable for an extension of leave, with pay, in the United States in order that he might identify this material, giving as an excuse for not having already done so the fact that he had remained at St. Louis to act as a juror in judging exhibits. As this action on his part was taken without authority, he has been instructed to remain in the United States for six weeks, without pay, in order to complete this work.

CHEMICAL WORK.

The routine work of the chemical laboratory performed for other bureaus of the insular government has, like that of the biological laboratory, very largely increased during the past year and has almost monopolized the time of the laboratory force, which has been considerably weakened by sickness among its members, due no doubt in large part to the intolerable heat and the insanitary surroundings of the old chemical laboratory. In the present undeveloped state of the natural resources of the country it is important that research work of a practical nature looking to their development should be undertaken and pushed to completion as soon as possible. Chemical investigation is of a peculiar nature, in that it requires the employment of complex apparatus and appliances and that its operations having once begun must, in many instances, be pushed through without interruption, or materials will spoil and the work will have to be repeated. It is therefore usually impracticable to turn from routine work to investigation and keep both going at the same time. In the necessary effort to reduce expenses the Commission made up for the necessary addition of the engineering force required in operating the machinery of the new building by abolishing one position in the chemical laboratory which was vacant at the time and by discontinuing another, soon to be vacated, upon the date of resignation of its present incumbent. It is not certain that the necessary routine work, which will inevitably be materially increased in meeting the needs of the newly organized bureau of internal revenue, and which will now further expand for the reason that operations requiring power, steam pressure, or vacuum extracting, distilling, and drying apparatus are now possible, can be done by the force at present authorized; but the employees of the chemical laboratory will doubtless do their best in the future, as they have in the past, and with more healthful surroundings and vastly increased facilities for their work should be able to accomplish more than ever before.

Mineral analysis.—The work on the minerals of the islands has continued, but in a somewhat desultory manner, for the reason among others that a considerable part of the time of the men whose duty it is to carry it on has necessarily been employed in routine work of other and more immediately urgent character. Mr. F. A. Thanisch undertook a trip to Cebu in order to investigate the possibilities of cement production. Samples of limestone and coal which he obtained have now been analyzed, and enough has been learned to make it highly probable that materials for the manufacture of good cement may be obtained in these islands. Cement is used here in large and constantly increasing quantities. Much of that imported is of poor quality, and all of it is expensive, owing to heavy freight charges. Further and thorough investigations along this line are needed. If good cement can be produced here at moderate cost an industry of importance both to capitalists and to the Government might be established.

Other work.—There have been made analyses of the civil hospital for clinical purposes; examinations for the custom-house to determine classifications under the tariff or to detect frauds; analyses of soils and of agricultural and forest products for the bureaus of agriculture and forestry; analyses of water for the board of health;

examinations for the detection of poison in the human stomach, of blood stains on garments, etc., as well as analyses of a great variety of products for private persons.

Division of chemical work.—The chemical work performed was divided among the bureaus of the insular government and private individuals as follows:

	Number of analyses.
Board of health	32
Bureau of agriculture	106
Bureau of government laboratories	56
Ethnological survey	8
Civil hospital	457
Custom-house	200
Exposition board	20
Bureau of forestry	41
Insular purchasing agent	29
Mining bureau	38
Secret service	5
Bureau of architecture	4
Bilibid prison	99
Police department of Manila	18
Other government institutions and officers	37
Private	185
Total	1,335

as against 764 for the previous year.

A large amount of work will be necessary on material which the field party of the mining bureau will collect. A series of specimens secured by this party in the Mancayan-Suyoc region has just been received at the laboratories, and work upon it has begun.

RESEARCH ON COCOANUTS.

The stimulation of cocoanut production, at present a source of considerable wealth to the Philippines, is a matter of much importance. The trees thrive on ground which is worthless for other purposes. They require comparatively little care, and when grown in large numbers are not often seriously injured by the attacks of insects or by unfavorable climatic conditions other than long-continued drought. At present nuts are, as a rule, planted haphazard, without regard to the productivity of the trees from which they come. Plantations are cultivated little, if at all. Fruit is often harvested before maturity; no use whatever is made of the husk except for fuel. Copra is sun dried at considerable expense and with constant risk of heavy loss from sudden showers, or, during the rainy season, is placed in bins and smoked over slow fires; the resulting product is often badly injured before or during shipment by mold and dampness, and the contained oil rapidly becomes rancid. A comprehensive investigation has been carried on during the year by cooperation between botanists, chemists, bacteriologists, and entomologists of the bureau of government laboratories and the superintendent of the San Ramon farm, Mindanao, where the government is raising cocoanuts with a view to settling many mooted questions as to the best method of germinating and planting the nuts, the kind of soil on which they can be grown to best advantage, practical methods of combating harmful insects, kinds of nuts which produce the largest

percentage of copra and oil, the degree of maturity which nuts should attain before copra is made in order that the highest percentage of oil may be obtained, the possibility of economical and advantageous use on a commercial scale of the vacuum drier in making copra, practical methods of preventing rancidity in copra and cocoanut oil, machinery for the extraction of the coir from the husk and the advantageous utilization of the cellulose material left after such extraction and of press cake when oil is obtained by compression, the relative cost of extraction methods involving the use of heat and pressure as compared with those involving the use of solvents, the manufacture from cocoanut oil of food products, the importance or nonimportance of evenly distributed rainfall and of planting groves where the trade winds will have ready access to them, the practical value of cultivating and enriching the soil, and the existence or nonexistence about the roots of trees of nitrogen-producing bacilli.

Practical results of great importance to intelligent planters are expected from this research, which is progressing favorably. Much has been written about cocoanut culture, but comparatively little careful and reliable investigation has been made. It seems that certain trees make excellent growth and fruit heavily when planted in sea sand, which is almost without plant food, provided their roots are laved by the rising tide and the sea breeze fans their leaves. Should it prove that their ability to live and flourish is dependent upon the presence of a nitrogen-producing organism capable of cultivation and distribution, so that the barren wastes of sand along our long coast line can be made to produce cocoanuts advantageously, it would obviously be more economical to plant them there than to give up rich soil to their cultivation and incur the expense of purchasing and using artificial fertilizers.

DIVISION OF WEIGHTS AND MEASURES.

Dr. Gilbert N. Lewis, physical chemist in charge of the division of weights and measures, reached Manila on September 7, 1904, about two weeks before his rooms in the new building could be completed. He will at once begin the work of standardizing weights and measures. When such standardizing is possible, it will be feasible to enforce a proper law for securing uniform weights and measures and punishing the users of those which are false.

DIFFICULTIES DUE TO COST OF LIVING.

The superintendent of government laboratories calls attention in his report to the difficulties encountered by the employees of his bureau, owing to the high cost of living in Manila and to the undesirable and insanitary quarters occupied by them in their attempts to keep their expenses within their receipts or to save a little money. This is, of course, but one phase of the large and important problem of securing for all government employees at Manila comfortable and sanitary quarters and proper food and drink at a reasonable price. It is understood that a committee appointed by the civil governor has this matter under consideration. It is certainly worthy of careful investigation.

PUBLICATIONS.

Although the time of the entire force of the bureau of government laboratories has been largely given up during the year to routine work, a number of important researches have been completed and the following bulletins have been issued:

No. 11, 1903. Biological laboratory.—Entomological Division, Bulletin No. 1, Preliminary Bulletin on Insects of the Cacao. By Charles S. Banks, entomologist.

No. 12, 1903. Biological laboratory.—Report on Some Pulmonary Lesions Produced by the Bacillus of Hemorrhagic Septicæmia of Carabaos. By Paul G. Woolley, M. D.

No. 13, 1904. Biological laboratory.—A Fatal Infection by a Hitherto Undescribed Chromogenic Bacterium: Bacillus Aureus Fœtidus. By Maximilian Herzog, M. D.

No. 14, 1904. Serum laboratory.—Texas Fever in the Philippine Islands and the Far East. By James W. Jobling, M. D., and Paul G. Woolley, M. D. Biological laboratory.—Entomological Division, Bulletin No. 2, The Australian Tick (Boophilus Australis Fuller) in the Philippine Islands. By Charles S. Banks, entomologist.

No. 15, 1904. Biological and serum laboratories.—Report on Bacillus Violaceous Manilæ: A Pathogenic Micro-organism. By Paul G. Woolley, M. D.

The following additional bulletins have been completed and are now in press:

No. 16. Biological laboratory.—Protective Inoculation Against Asiatic Cholera: An Experimental Study. By Richard P. Strong, M. D.

No. 17, 1904. New or Noteworthy Philippine Plants. By Elmer D. Merrill, botanist.

No. 18, 1904. Biological laboratory.—I. Amœbæ: Their Cultivation and Etiological Significance. By W. E. Musgrave, M. D., and Moses T. Clegg. II. The Treatment of Intestinal Amebiasis (amœbic dysentery) in the Tropics. By W. E. Musgrave, M. D.

No. 19, 1904. Biological laboratory.—Some Observations on the Biology of the Cholera Spirillum. By W. B. Wherry, M. D.

No. 20, 1904. Review of the Identifications of the Species of Blanco's Flora de Filipinas. By Elmer D. Merrill, botanist.

Doctor Strong's bulletin on protective inoculation against cholera and the bulletin of Doctor Musgrave and Mr. Clegg on the cultivation of amœbæ and on amœbic dysentery and its treatment are especially important.

CLINICAL WORK.

The number of clinical examinations made by the biological laboratory on human subjects for the year ending August 31, 1902, was 3,816; for the year ending August 31, 1903, it was 6,535; and for that ending August 31, 1904, it was 30,830.

The director of the biological laboratory calls attention to the fact that there has been a falling off in the number of clinical examinations made at the request of outside physicians. This he ascribes to the charges imposed and to the fact that such examinations are made free of charge at the small army laboratory at Manila. He recommends that all charges for such work be abolished. The undersigned does not concur in this recommendation. The working force engaged in making these examinations is already nearly swamped by the volume of work thrown upon it. The charges made by the laboratory for such biological work, when requested by private physicians, are moderate, and there is no reason apparent why they should not

have it done elsewhere if they prefer to do so. Such a course on their part would result, so far as the laboratory is concerned, in decreasing somewhat the burden of routine work and leaving more time for independent investigation, which is urgently needed.

Clinical work on cattle.—Nine thousand five hundred and sixty-nine examinations for surra were made during the year, of which 1,123 were positive. Numerous examinations for glanders, pseudo-farcy, and hog cholera were also made.

Autopsies.—Two hundred and seventy-one autopsies were performed, an increase of 71 over the preceding year.

Plague work.—Interesting evidence has been obtained by the examination of rats as to the greatly improved condition of the city with reference to plague. Not one of the rats examined during the year has been infected with this disease. During the previous year one-sixteenth of 1 per cent of the rats examined were found to be so infected, and when the plague epidemic was at its worst, shortly after the organization of the board of health, 2.3 per cent of the rats examined were suffering from this disease.

WORK OF THE GOVERNMENT PHOTOGRAPHER.

Mr. Charles Martin, the government photographer, has not only performed the large amount of routine work required of him, including the making of 4,200 prints, but has found time greatly to increase his knowledge of photography. He now does first-class copying work, makes admirable enlargements, is very successful with X-ray work, and has secured a fairly good working knowledge of micro-photography, which has been carried on under the greatest difficulties, as vibrations in the loosely constructed chemical laboratory made it necessary to take all micro-photographs late at night, and even then prohibited any but very short exposures. This difficulty will be entirely overcome in the new building, where the micro-photographic apparatus will be set on cement piers.

Mr. Martin has also made two expeditions into the provinces. During the first of these he secured 126 negatives showing the work on the Benguet road. During the second he visited the provinces of Abra, Lepanto-Bontoc, Isabela, and Nueva Viscaya, in order to secure for the ethnological survey photographs showing types of the less known non-Christian tribes of this region and illustrating their houses, methods of industry, religious rites, amusements, etc. Seven hundred and fifty excellent negatives were taken, of which 500 were developed in the field under very trying conditions.

Numerous short expeditions for the purpose of doing work for the bureau of agriculture and other bureaus of the government were also made.

INCOME FROM PRIVATE WORK.

The funds received by the bureau of government laboratories during the fiscal year ending June 30, 1904, for clinical, chemical, and other work performed for private persons and for the city of Manila, and for vaccine virus and serums sold to private persons, amounted to ₱40,098.07, Philippines currency, and $2,381.69, local currency.

VALUE OF WORK PERFORMED FOR OTHER BUREAUS.

Under existing regulations no charge is made for work performed on official business for other bureaus or offices of the government, but a record is kept of the value of such work if paid for in accordance with the established scale of charges. For the fiscal year ending June 30, 1904, it was as follows:

	Local currency.	Philippine currency.
Civil hospital	$5,392.00	P4,598.44
Bureau of public instruction	375.00	322.08
Custom-house	342.00	1,860.50
Benguet road	1.00	15.00
Settlement House	9.00	21.00
Board of health	29,272.00	26,681.90
Bilibid Prison	246.00	978.00
Bureau of agriculture	2,603.00	526.48
Mining bureau	90.00	529.00
Bureau of forestry	618.00	389.00
Ethnological survey	30.00	478.28
Civil governor		3.12
Secretary of the interior		140.32
Bureau of architecture		10.00
Government carabao		5,757.00
Insular treasurer		140.00
Insular purchasing agent		255.00
Civil sanitarium, Baguio, Benguet		25.00
Bureau of engineering		110.00
Consulting engineer		30.00
Coast and geodetic survey		37.00
Civil-service board		6.00
Coast guard and transportation		50.00
Quarantine service		3.00
Exposition board	343.00	
Bureau of public printing	50.00	
Improvement of the port	100.00	
Total	39,471.00	42,966.12

It should be understood that the work above listed includes only that performed by request for the several bureaus of the insular government, the city of Manila, government officers, and private persons, and does not include the investigations and other work undertaken by the bureau of government laboratories upon its own motion.

The following table shows the amount and value of sera and prophylactics prepared at the serum laboratory for the fiscal year ending June 30, 1904:

		Quantity.	Value.
Antirinderpest serum	cubic centimeters	1,279,598	P63,979.90
Vaccine virus	doses	2,316,140	69,484.20
Plague prophylactic	cubic centimeters	36,183	24,074.00
Mallein	doses	1,050	1,050.00
Total			158,588.10

For further details relative to the work of the bureau of government laboratories for the year ending August 31, 1904, reference is made to the report of the superintendent. (Appendix J.)

THE BUREAU OF PUBLIC LANDS.

NEW LEGISLATION.

The rules and regulations relative to the lease, sale, or other disposition of public lands required to be prepared by the government of the Philippine Islands by section 13 of the act of Congress of July 1, 1902, were embodied in Act No. 926, entitled "The public land act," and having been submitted to the President of the United States and received his approval were transmitted to Congress for its action. Congress adjourned without amending or rejecting this act, which became a law by virtue of the provisions of section 13 of the act of Congress of July 1, 1902, upon the publication by the civil governor on July 26, 1904, of a proclamation declaring it to be in effect.

This act does not apply to the Moro Province, or to the provinces of Lepanto-Bontoc, Benguet, Paragua, and Nueva Vizcaya, but its provisions, or those of any chapter, may at any time, by resolution of the Commission, be extended over and put in force in any of these provinces or any part thereof. By resolution of the Commission of August 5, 1904, the provisions of chapter 5 relative to town sites were made applicable to the province of Benguet, in order to render it possible to establish a town site for the summer capital of the Philippines at Baguio.

Forms of application for land under the various chapters of this act have been prepared in English and are now being translated into Spanish and printed. Seven applications for entry of homesteads, 1 for lease, and 18 for free patents have been received. All of these applications were imperfect, and it has been necessary to return them for correction. This difficulty will be overcome when proper blank forms have been supplied. No applications to purchase public lands have as yet been made.

WORK OF THE CHIEF OF THE BUREAU.

During the year the chief of the bureau of public lands has been cited to appear before the court of land registration in 11 cases in which it was believed that the public lands were involved. While the government interests are protected in this court by the attorney-general, the chief of the bureau of public lands has in each case caused search to be made among old Spanish land titles in his custody for facts of importance, which have been called to the attention of the attorney-general if found.

At the date of the receipt of the first application for a patent to land alleged to contain coal no regulations were in force establishing a procedure whereby patents to coal lands could be issued. This lack was subsequently supplied by the enactment of Act No. 1128, which was drafted by the chief of the bureau.

Act No. 624, relating to the recording of mining claims, was amended during the year by Act No. 859, providing that fees for recording mining claims should be paid to provincial or district treasurers, and by Act No. 1134, providing for the recording of any document alienating, mortgaging, leasing, or otherwise affecting the possession of mining claims or any right or title thereto or interest therein. This act also was drafted by the chief of the bureau.

ADMINISTRATION OF SPANISH MINING GRANTS TRANSFERRED.

The act of Congress of July 1, 1902, provides that Spanish mining grants perfected prior to April 11, 1899, shall be conducted under the provisions of law in force at the time they were granted, subject at all times to cancellation by reason of illegality in the procedure under which they were obtained or failure to comply with the provisions prescribed as requisite to their retention in the laws under which they were granted. By Act No. 915 the administration of such grants was transferred from the mining bureau to the bureau of public lands.

The chief of the bureau of public lands has been directed to investigate the status of all the so-called Spanish mining grants, with a view to the institution of proceedings for the cancellation of any grant in connection with which the provisions of Spanish law have not been observed.

NECESSITY FOR A SYSTEM OF LAND SURVEYS.

The chief of the bureau of public lands in his annual report calls attention to the urgent need of a comprehensive system of land surveys at the earliest practicable time. The undersigned concurs fully with the chief of the bureau as to the great necessity for such a system of land surveys to supplement the excellent work now being done by the branch office of the United States Coast and Geodetic Survey. It is hoped that assistance in this matter may be secured from the United States Geological Survey, as the present state of the insular finances is not such as to render it feasible to undertake this work and pay for it from insular revenues.

RECORD OF SPANISH LAND TITLES.

The work of examining and entering on a tabulated list expedientes relating to Spanish land titles has been continued through the year as opportunity has offered, and has included 3,284 expedientes of sales and composiciones, and 603 expedientes of illegal appropriations. It is expected that this work will be completed before September 1, 1905.

SAN LAZARO ESTATE.

The city engineer of Manila has completed plans for the improvement and extension of the street system through this estate, which is, as heretofore, administered by the chief of the bureau of public lands. Comparatively little actual improvement of the proposed streets has thus far been made, but stone monuments marking their corners have been put in at about one-third of the points where they will be required. As the city has charge of the street work only, the chief of the bureau of public lands has begun a resurvey of the entire estate, selecting such blocks as have been definitely established by the city engineer and dividing them into lots of proper dimensions, which vary with the varying area of the blocks. These subdivisions have been made with a view to the convenience of tenants, the betterment of sanitary conditions, and the diminution of risk from fire. Upon the completion of the survey of each block tenants who had previously constructed their houses without regard to order, alignment, or convenience were induced to remove them within the lines of regular subdivisions and to align them according to established rules. It is

interesting to note that almost no opposition was experienced in accomplishing this, the tenants by their cheerful cooperation showing a personal interest in the plans for the improvement of their condition.

On April 21, 1904, there occurred one of the disastrous fires which may be expected to devastate the San Lazaro property so long as the use of the so-called light materials (nipa and bamboo) for building purposes is permitted. Two blocks of buildings were almost totally destroyed.

For the year ending August 31, 1904, rents were received aggregating $15,988.92, United States currency, as compared with $12,670.92 for the preceding year.

On June 14, 1904, the Archbishop of Manila and the religious corporation of the Franciscan Fathers of the Province of San Gregoric Magno of the Philippines brought suit against the chief of the bureau of public lands to recover the administration of the property of the San Lazaro Hospital. The prosecution of this suit has been suspended pending the enactment of legislation providing a method for the settlement of property disputes between the Catholic Church and the insular government.

A growing disposition on the part of many of the tenants of this estate to avoid the payment of their rents has been noted during the past year, and has made necessary the institution of suits for ejectment against a considerable number of them. It is believed that the outcome of these suits will be such as to produce a wholesome effect on other tenants.

FRIAR LANDS.

The work of subdividing the friar lands and of attending to the details of leasing and selling the different subdivisions will devolve upon the bureau of public lands. With a view to its accomplishment, an increase in the force of the bureau sufficient to allow the placing of five surveying parties in the field has been authorized.

SPECIAL WORK PERFORMED BY THE CHIEF.

The chief of the bureau has been twice ordered into the provinces to assist officers of the bureau of justice in criminal cases by performing expert work involving questions of disputed handwriting. On March 28 the chief of the bureau was directed to proceed to the island of Culion to purchase the property of private owners in and in the vicinity of the town of the same name, in order to make possible the establishment of a leper colony there. The thanks of the undersigned are due him for the efficient manner in which the work, which presented many difficulties, was performed. All the pieces of property desired were secured without litigation and at moderate prices which were satisfactory to the owners and fair to the government.

For further details as to the work of the bureau of public lands, reference is made to the report of its chief for the year ending August 31, 1904. (Appendix K.)

THE BUREAU OF AGRICULTURE.

Dr. F. Lamson-Scribner, chief of the bureau of agriculture, left the Philippine Islands on December 15, 1903, to spend his accrued

leave of absence in the United States. He subsequently tendered his resignation to take effect on March 23, 1904.

Mr. W. C. Welborn, assistant chief of the bureau, succeeded him as acting chief on December 15, 1903, and was appointed chief on July 1, 1904. Mr. Welborn, with the energy and efficiency which are characteristic of him, at once undertook to put the work of the bureau on a more satisfactory basis, and substantial progress has been made toward securing practical results. The present chief has obtained increased efficiency and has materially reduced expenses. There has been a notable decrease in the number of reports and newspaper articles setting forth the anticipated future achievements of the bureau and a gratifying improvement in the returns from the experiment stations, the rice farm, and the stock farm. Seven resignations, 2 transfers, and 1 removal, many of which occurred soon after the resignation of the former chief of the bureau, have resulted in materially strengthening the working force. The net result for the year has been a decrease of 7 regular employees and an increase in the number of laborers. The chief of the bureau was of the opinion that it would be beneficial to the service to have more labor, more animals, and more work done in proportion to the number of high-salaried employees. This view was concurred in by the undersigned, and results have demonstrated its wisdom.

Increased attention has been paid to the raising of forage on the experiment farms. The San Ramon farm and the Batangas experiment station are now practically self-supporting, and considerable amounts have been collected by the Manila and Trinidad stations and by the La Carlota estate in western Negros.

No additional stations have been established. It was felt that with eight experiment stations and farms already in operation the wiser course would be to put sufficient energy, material, and labor into these enterprises to insure satisfactory results before entering upon other similar undertakings.

ESTABLISHMENT OF A DAIRY FARM.

An exception was made, however, in favor of the establishment of a dairy farm in the suburbs of Manila. The attending physician and surgeon in charge of the civil sanitarium at Baguio had applied for and received authority to purchase milch cows. The attending physician and surgeon in charge of the civil hospital at Manila was preparing to ask for the establishment of a dairy farm for that institution, which was running a milk bill of $4,000 gold per year and getting in return an insufficient supply of milk of unsatisfactory quality. The commissioner of public health was asking for milch cows for the San Lazaro Hospital. Milk was almost unobtainable by the sick, except in a few special cases through friends of the few persons who were fortunate enough to own cows, and then at a cost of 50 to 75 centavos, Philippine currency, per wine quart. The chief of the bureau of agriculture was therefore authorized to make purchase of 60 high-grade Jersey cows and heifers and to establish a dairy farm.

In order to avoid the certainty of heavy loss from Texas fever, he secured animals from the Texas fever belt in Mississippi. Sixty-four cows and 1 bull were bought for the sum of $3,500. They were shipped on the animal transport *Dix*, and 60 of them arrived safely

at Manila on August 27, 1904, after a trip of more than 10,000 miles, which occupied two months. Before their arrival good pasture was obtained and fenced, and one of the buildings at the San Juan powder mill was converted into a fly-proof stable.

The animals on arrival were at once given temporary serum immunity against rinderpest. No trouble from foot-and-mouth disease was experienced, nor did any rinderpest appear among these cattle until a veterinarian of the bureau of government laboratories took it upon himself without prior consultation with the superintendent of laboratories to inoculate 37 of the animals by the simultaneous method, in order permanently to immunize them against this disease. In view of two previous disastrous experiences in attempting to immunize by this method cattle coming from countries where rinderpest has never existed, the superintendent of laboratories had been instructed to see that great care was exercised in immunizing these animals, and it had been suggested to him that they be given serum immunity until they were in the best of physical condition, and that an attempt then be made permanently to immunize them by the simultaneous injection method, experiments being made on one or two animals at a time, and the animals experimented upon being isolated from the remainder of the herd. The invariable success of inoculations made on Philippine and Chinese cattle had inspired the veterinarian of the bureau of laboratories with undue confidence, and acting merely on his own responsibility, although with the knowledge and approval of the chief of the bureau of agriculture, he employed the simultaneous inoculation method, which had been extraordinarily successful with Philippine and Chinese cattle. The result was disastrous, the animals displaying so high a degree of susceptibility to rinderpest that the serum failed to hold them, and all but 7 died, thus once more emphasizing the fact, which should already have been sufficiently apparent from past experience, that much remains to be learned relative to the immunization of animals from countries where rinderpest has never existed, and that with our present knowledge the utmost care is necessary to prevent serious loss.

In extenuation of the unauthorized and careless action of the veterinarian of the bureau of government laboratories in this instance, it should be stated that he had employed inoculation by the simultaneous injection method in immunizing a small herd of Jersey cattle previously imported by the bureau of agriculture from the United States without the loss of a single animal.

The cows still remaining, together with a number of calves which were successfully immunized, showing no ill effects from the inoculation, will form a good nucleus for a herd, and it is hoped that one of the great difficulties heretofore encountered in the treatment of intestinal troubles and the artificial feeding of young infants through inability to secure sufficient pure milk may ultimately be overcome.

While tropical grasses tend to coarseness and become woody during the dry season, green corn, teosinte, and other succulent crops will grow luxuriously throughout the year, and concentrated food can be had at reasonable expense. Rice by-products are as cheap as in Louisiana, while wheat bran from Australia costs only about 25 per cent more than does a similar article in the United States. The establishment of plants for cocoanut oil extraction should ultimately make a

large amount of press cake available. The bean which produces the cake and oil of China and Japan has been successfully grown in an experimental way, and the velvet bean, so largely cultivated in Florida, flourishes here. It should be borne in mind that the temperature at Manila is never so high as it is for three months of the year in the Gulf States. If animal diseases can be successfully combated, dairying in Manila will be profitable.

OTHER ANIMALS RECEIVED.

The bureau has received, in addition to the cattle above noted, 8 Australian mares, 33 native mares, 40 Kentucky mares, 13 stallions, 10 Australian work horses, 10 jacks, 5 head of Jersey cattle from the United States, 4 Berkshire hogs, and American chickens of three breeds. No contagious disease has thus far attacked any of these animals.

HORSES AND JACKS.

All of the mares, as well as 2 of the jacks and 1 stallion, were ordered for work and breeding purposes. The remaining stallions and jacks were for the most part ordered originally by different provincial governments, but were not taken on arrival, a very long period having elapsed since the orders were placed, and the ravages of surra, financial difficulties, and other causes having rendered it useless or financially impossible for the provinces ordering them to pay for them. Ten jacks were imported by the insular purchasing agent. Two of these had been ordered by the chief of the bureau of agriculture and were promptly transferred to the Singalong station. They have remained in good health. The 8 which remained were quartered in the corral of the insular purchasing agent. Five of them promptly contracted surra; 3 remaining uninfected and will soon be turned over to the bureau of agriculture.

PROPOSED BREEDING STATION FOR HORSES.

The 40 Kentucky mares and 11 stallions which came on the *Dix* with the Jersey cattle arrived in fine condition. These animals were selected with great care in the United States by Mr. John G. Speed, with a special view to the making of experiments in the direct breeding of American horses in the Philippines and in the breeding of native mares to American stallions and vice versa. Among the stallions sent were some fine Arabs and Morgans, which, when bred to native mares, ought to produce the best results. Breeding operations will be carried on by the bureau of agriculture on the La Carlota estate in western Negros, where 30 of the Kentucky mares and 1 stallion have been sent; at the rice farm at Murcia, Tarlac, where the Australian mares and 2 stallions will be kept, and at Baguio, Benguet, where it is proposed to establish a central breeding station in charge of Dr. H. L. Casey, who has had twenty years' experience as a breeder in Kentucky, and who came to Manila in charge of the horses above mentioned and of others for the city of Manila. Baguio has been selected as the site for the central breeding station on account of its temperate climate, its freedom from surra, which has never invaded the high mountain region of northern Luzon, its proximity to the

Trinidad experiment station, where oats and clover can be grown successfully, and to pasture lands furnishing grass of a better quality than is found in the lowlands. Ten of the Australian mares and at least 2 of the stallions, including the best Arab, will be sent there from the outset, and additional native mares and stallions will be purchased as required.

The remaining stallions, suitable to breed to native mares, and the jacks will be used in the provinces as may seem advisable. One stallion has already been sent to Romblon, in charge of the governor of the province, and two have been sent to the province of Batangas in care of employees of the bureau of forestry.

While Doctor Casey will make his headquarters at Baguio, he will have general supervision over all breeding operations and will purchase native mares and horses with a view to advantageous crossing with American animals and to the preservation of some of the fine blood which now exists in these islands, but is in danger of disappearing.

It is earnestly hoped that mares, rather than geldings, will hereafter be purchased by the insular government for draft purposes. They can be bred and at the same time worked in moderation, and if it is not deemed advisable to breed them while they are being worked they may be available for breeding purposes when no longer useful as draft animals.

JERSEY CATTLE.

Of the five head of pure Jersey cattle imported two were heifers and three were bulls. One of the bulls had lump jaw on arrival and afterwards died, but the breeder from whom it was purchased has promised to deliver another in its stead. Both of the heifers have dropped calves since arrival, but neither has given entirely satisfactory milk. This is probably due to the fact that they have not had fly-proof stables or pasture. They will now be transferred to the dairy farm, where better results are expected.

HOGS.

Imported Berkshire boars have done well and the Filipinos have been greatly pleased with them. Many half-breed pigs have been raised and sold to the people at low prices. Nine additional head of Berkshires have been ordered by cable. Hogs can be raised at a handsome profit in these islands, as the meat brings about 10 cents gold per pound on the hoof, while half a million dollars' (gold) worth of ham, bacon, and lard are now being annually imported. The necessary foodstuffs can be cheaply purchased or raised. Hogs seem to be more free from disease here than in the United States, and at Manila ice and cold storage are abundant and reasonably cheap.

PURE-BRED FOWLS AND CROSSES.

Fine representatives of brown and white leghorns and buff cochins were imported in December. They did well during the dry season, but fell off during the rains, at which time it proved almost impossible to raise chickens. Half-breeds between leghorns and native fowls have developed into small, hardy, well-muscled birds, with a good

proportion of white meat of excellent quality. Plymouth Rock grades obtained by the chief of the bureau of forestry by breeding Plymouth Rock cocks to native hens have produced fine fowls of excellent constitution.

Chickens are fairly abundant and cheap in the Philippines, and it is doubtful if Americans can compete with Filipinos in raising them. Guinea fowls are almost unknown. Turkeys recently imported from the United States have thrived. The turkey hens nested during the latter part of the dry season and the young were sufficiently matured before the rains came on to be little affected by them. Turkeys require no feeding, on account of the abundance of insects.

BEEF BULLS.

An Australian beef bull, apparently a nearly pure shorthorn, has been used for some time at the Culion stock farm on cows imported from Shanghai. What the result of this cross will be remains to be seen. Young Devon and Galloway bulls have been ordered by cable from the United States for use with native cows, which, although small and useless for dairy purposes, give a good quality of beef. It is hoped that by the use of proper bulls considerable increase in size may be secured.

About a million dollars' worth of cattle are now imported annually into the islands, and a healthy steer weighing 700 pounds on the hoof costs $40 gold. With a good permanent market assured, inoculation against rinderpest a success, and abundant cool and well-watered mountain grazing lands available, the raising of beef cattle on a large scale should give handsome returns.

STOCK FARM AT CULION.

A limited number of horses sent to the Culion stock farm have done very poorly, suffering greatly from the attacks of flies and ticks, and apparently from insufficient nourishment as well. It has been found impracticable to subsist them on the native grasses. They will be transferred, as soon as transportation is available, to Murcia or Baguio.

The cattle on this farm are Chinese heifers shipped from the Serum laboratory, where they had been used in serum or vaccine manufacture. They have done fairly well. Señor Palanca has a herd of native cattle at a point near the stock farm, and there are numerous wild cattle and carabaos on the island. The valley where the stock farm is now located has abundant pasture for 1,000 head of cattle, and the number of animals kept there will be increased as rapidly as practicable, with a view to supplying beef to the leper colony.

FODDER ON GOVERNMENT FARMS.

It having been demonstrated experimentally that teosinte, corn, and sorghum could be grown abundantly and cheaply, superintendents of government farms were directed to increase their plantings, so as to afford an abundant and constant supply of forage for all their draft animals. As a result the purchases of hay, except for animals newly

arrived, have almost entirely ceased, and the cost per head of feeding draft animals is not more than one-half what it was a year ago.

SINGALONG EXPERIMENT STATION, MANILA.

This station has been conducted under the personal direction of the present chief of the bureau for a year. It includes 10 acres of land on which are being tried various forage crops, fruit trees, American vegetables and field crops, and fiber and other plants.

Okra, eggplants, corn, lettuce, radishes, beets, garlic, leeks, onions, and peppers have been found to succeed well at any season, provided moisture conditions are good. Cabbages, garden peas, tomatoes, turnips, and carrots succeed only during the dry, cool months from November to April. Melons and cucumbers do not succeed at any time. One good crop of summer squashes has been grown. Onions have not made good bulbs. Asparagus has done fairly well, but does not produce so many large shoots as in the United States. Irish potatoes have not succeeded.

Okra has done exceptionally well. It is a vigorous, rapid grower, holds its own against weeds, and furnishes a constant supply of excellent and easily prepared food. Its use should become general throughout the islands and the bureau is now saving large quantities of seed for distribution.

Orange, lemon, and olive trees are growing well, but have not come into bearing. Figs have borne good fruit and grapes are flourishing. Improved varieties of papaya have given excellent results. Bananas from Hawaii have fruited, but are not to be compared with the best native varieties. Hundreds of young alligator pear trees are in flourishing condition.

Forage crops.—Alfalfa has failed completely at Manila and elsewhere in the islands except at Trinidad, where the result is still in doubt. Teosinte has continued to make exceptionally heavy yields during the rainy season, but does not resist drought well. It is greatly relished by horses, cattle, and hogs. The several determinations made from green teosinte fodder as ordinarily fed show that it contains but 12½ per cent of dry matter, so that a person buying it at $10 gold per ton pays $80 gold per ton of dry matter, but zacate, the green grass sold so largely in Manila, is even dearer; it contains 14 per cent of dry matter and at the prevailing price of 40 cents gold per hundred bunches, gives a ton of dry matter at a cost of $108 gold.

Sorghum and Kaffir corn.—Thirteen months ago a stalk of sweet sorghum resembling the orange variety was found growing among some fruit trees at Singalong. The seed was saved and planted, and all the seed made was planted again. As a result, more than 60 bushels of seed have been saved and several crops of forage secured. This plant made good crops throughout the dry season without irrigation. Three cuttings were obtained from each planting of seed. A tenth of an acre sown broadcast in June and cut in August produced at the rate of 18 tons of green forage to the acre. Two analyses showed an average of 28 per cent of dry matter at the time of cutting. Another tenth of an acre produced at a single cutting at the rate of 28 bushels of seed per acre. It will be seen, therefore, that this new crop is very promising.

Several lots of imported Kaffir corn seed proved bad, but success



GRAPE VINES AT SINGALONG EXPERIMENT STATION.

Photograph by Martin.



SORGHUM AT SINGALONG EXPERIMENT STATION.

Photograph by Martin.



VELVET BEANS AT SINGALONG EXPERIMENT STATION.

Photograph by Martin.

was at last obtained and a fine crop is now just coming to maturity.

Velvet beans.—A patch of velvet beans sown at the beginning of the wet season covered the entire ground to a depth of 3 or 4 feet with a dense tangle of vines and leaves so thick as not to allow a spear of cogon or other noxious grass to grow. The vines are fruiting heavily, and this most valuable nitrogen-producing plant seems likely to be a great success. It should yield 25 to 30 bushels of beans, very valuable as food for stock, per acre, and the chief of the bureau of agriculture is confident that the raising of a good crop of velvet beans during the dry season on rice land will double the next rice crop.

Soy beans.—The Japanese soy bean, which makes a more nitrogenous stock food than does the velvet bean, is now coming to maturity and promises a fine crop.

Sulla.—Sulla, or Egyptian clover, tried at Manila and elsewhere in the islands, has failed, but white and red clover have been successfully grown at Trinidad, Benguet.

New equipment.—Important results have certainly been obtained from the 10 acres of land at Singalong during the past year. New barns and sheds have been erected, and machinery, tanks, and pipes for irrigation have been installed. The water supply has proved insufficient and the boring of an artesian well will probably be necessary.

SEED AND PLANT INTRODUCTION.

This work was handicapped at the outset by the fact that nearly all seed sent out was bad and failed to germinate, so that experimenters became discouraged. All seed is now tested before distribution, and failure to germinate is rare. Furthermore, sufficient information has been gathered to allow of the sending out of the proper kinds of seed at the proper seasons and to people living where conditions are such as to promise success. The Trinidad station in particular will be used for growing seeds of most of the staple kinds of temperate-zone vegetables.

BATANGAS STATION.

The chief of the bureau reports the Batangas station in a flourishing condition, and states that it affords an attractive and instructive object lesson in the province in which it is located. The soil is better than that at Manila, and excellent corn of a quality which has astonished the people has been produced. Teosinte and other crops grow well. The sales of forage, corn, vegetables, etc., just about meet the expenses of the station.

Seven hundred pounds of seed cotton to the acre were grown at this station during the past season. This is more than the average crop in the United States, and the chief of the bureau states that the quality was as good as that of upland cotton at home. At the time this cotton was gathered there was an excellent prospect that the stalks would produce as much more, but a species of boll weevil attacked the plants and destroyed every young boll. This insect also prevented the production of cotton at Manila and at La Carlota, but at San Juan de Boc-Boc, Batangas, where the bureau distributed seed and placed a hand gin, about 30,000 pounds of lint cotton were made.

The chief of the bureau is of the opinion that a quick-maturing variety of cotton may make a fair yearly crop in the Philippine Islands, as in Texas, before the weevil has time to become numerous enough to do much harm.

Fine Spanish peanuts were grown at the Batangas station, where the results in growing vegetables have been practically the same as at Manila.

COFFEE PLANTATION AT LIPA, BATANGAS.

The manager of the Batangas station is also superintendent of the coffee plantation at Lipa, where 10 acres of young trees are thus far free from any sign of disease. The fact that the coffee plantations of Batangas Province, formerly a source of great wealth to the inhabitants, were annihilated in the years 1888 to 1890 has been mentioned in previous reports. The coffee growers were so discouraged that they have never made any effort to rehabilitate the industry. The present experiment is being conducted at government expense, with a view to demonstrating whether the reestablishment of the once important coffee-growing industry in the lowlands of the Philippines is possible. It may incidentally be mentioned that coffee of excellent quality is produced in Benguet, Lepanto, and Bontoc, and that these mountain plantations, although badly cared for or utterly neglected, seem never to have suffered seriously from disease.

EXPERIMENTS AT BAGUIO AND TRINIDAD, BENGUET.

The last annual report of the bureau of agriculture detailed the failure of attempts to grow vegetables in Baguio soil. It is the opinion of the present chief of the bureau that this failure was not due to the presence of any poisonous substance in the soil nor to the absence of any essential element, but rather to the fact that the soil was broken too deeply and was too loose and incoherent. Plantings made during the present season while only indifferently successful, owing to exceptionally heavy rains, seem to demonstrate the correctness of this theory. Before the advent of dry weather other plantings will be made, and the chief of the bureau is confident that with the use of fertilizers success is certain. He observed native planters growing magnificent cabbages, turnips, tomatoes, potatoes, beans, etc., in this soil in May of the present year. In each instance the ground had been broken to a depth of 3 or 4 inches only and manure had been used.

The chief of the bureau reports the soil in Trinidad Valley to be richer than at Baguio, and states that he has never seen finer English peas and cabbages in any country than have been produced there. The peas in some instances made vines 10 feet in height, which were loaded with full pods, and cabbage heads were found which weighed 18 pounds. American onions were observed to produce good bulbs. Vermont potatoes yielded at the rate of 100 bushels to the acre without fertilizer or irrigation, and native potatoes, which were planted earlier and suffered less from drought, did better. Pumpkins, carrots, squashes, beets, spinach, parsley, kale, egg plant, beans, radishes, lettuce, cauliflower, and nearly all ordinary vegetables grow to perfection in the dry season with some irrigation, which has now been provided for. White and red clover and alfalfa were doing well



SITE OF EXPERIMENT STATION, TRINIDAD VALLEY, BENGUET.

Photograph by Worcester.



LETTUCE, BEANS, PEAS, CABBAGE, BANANAS, AND YOUNG MULBERRY TREES, TRINIDAD VALLEY, BENGUET.

Photograph by Worcester.



YOUNG OATS ON EXPERIMENT STATION AT TRINIDAD, BENGUET.

Photograph by Worcester.



A STOOL OF OATS FROM EXPERIMENT STATION AT TRINIDAD, BENGUET.

Photograph by Worcester.



KALE RAISED ON EXPERIMENT STATION AT TRINIDAD, BENGUET.

Photograph by Worcester.

in May, but the alfalfa did not flourish during the wet season. Oats make fine crops, and it is supposed that barley, rye, and wheat would do likewise. Teosinte, sorghum, and corn have done fairly well when the weather was not too cold and wet. Fruit trees and grapevines from America came near perishing during the last dry season before the completion of the irrigation ditch, which supplies the farm with water, but are now flourishing, although none of them have reached the bearing age. Additional tools, teams, and laborers have been sent to the Trinidad station, with a view to getting 40 acres under cultivation during the approaching dry season.

RICE FARM AT MURCIA, TARLAC.

The soil of this farm is poorer than that of most of the rice farms of the islands and is not as level as it should be to give the best results. About 1,000 acres can be put under cultivation. Eight hundred acres have been cleared and diked. Six hundred acres are now growing rice and 200 more will be planted by the middle of October. The last wet season's crop consisted of about 30 acres, on which the yield was very good. Four hundred acres were planted for the dry season with a quick-maturing Japanese seed never previously tried in the Philippines. The experiment resulted in failure, the Japanese rice not producing 20 per cent of the crop afforded by the regular Philippine dry-season rice, called "iníta." The Japanese rice proved too weak to hold its own against the strong tropical grasses.

Methods of planting rice.—The native method of planting rice in seeding beds and then transplanting by hand and the American method of direct seeding by the use of drills have both been tried. With the faulty methods of preparing land employed by the Filipinos it is doubtless better to transplant, as the young plants are thus given a good start over the weeds which might otherwise choke them out, but when land has been properly prepared the planting of rice with drills is feasible and gives excellent results.

Draft animals.—It is found that horses and mules stand the heavy work on the rice farm as well as in the Southern States of America. A native teamster with 4 mules plows 4 acres of land per day, while a native plowman with 4 Chinese oxen, of which some 10 head are in use on the farm, plows 2½ acres per day. The ordinary Filipino, using 2 carabaos, is able to plow about one-fifth of an acre per day. Two carabaos are used in order that they may be interchanged every two or three hours and allowed to get their mud baths, without which they soon become incapacitated for work.

Labor.—Filipino labor is abundant and satisfactory. The chief of the bureau was at first ridiculed when he insisted that Filipinos must drive the teams and do the plowing on the government farms, but they are now doing it on every farm controlled by the bureau of agriculture. Furthermore, they are doing it as well as Americans ever did and at prices amounting to but 6 to 10 per cent of what it formerly cost to get Americans to perform the same work.

Buildings.—New buildings adequate for the needs of the farm have been erected during the past year.

Steam thrasher.—Some 35,000 bushels of rice were thrashed for the neighboring people, the work extending over an area of approximately 125 square miles. Its purpose was to demonstrate to the Fili-

pinos the advantage of the steam thrasher. This machine got so much more rice from the stalks than they had been accustomed to obtain by tramping it out under foot after it had stood for weeks and been subject to the depredations of thieves and rats that they at first conceived the idea that rice hidden inside the separator was allowed to flow from the spout of the machine, thus augmenting the real output.

A period of three months is ordinarily consumed in thrashing rice by native methods, and 25 per cent of the crop is often lost. Native methods of hulling and cleaning are very crude and the valuable by-products are all lost, while rice thrashed by steam power is ready to go to the cleaning mill at once and 20 per cent of the rough rice is saved in bran and polish, which make excellent cattle food. The rice crop being thus quickly disposed of, the farmer and his laborers have time to put in other crops. As a result of the demonstrations made, several steam thrashing outfits have been ordered by Filipinos.

New machinery.—A complete outfit for steam plowing, harrowing, seeding, and ditching has been ordered by the bureau, and upon its arrival in October a considerable increase in the area cultivated in rice can be made.

A good straw baler has been installed at Murcia. It costs about $3 gold per ton to bale and ship rice straw to Manila, where there is quite a market for it at $10 per ton.

SAN RAMON FARM, MINDANAO.

During the past year the boundaries of this farm have been definitely fixed. It includes some 2,000 acres, of which not more than 9 per cent are at present under cultivation. The cultivated area is being increased as rapidly as possible. Difficulties caused by disease among the draft animals and by shortage of labor have prevented the making of rapid progress. If the steam plow ordered proves successful in actual operation another one will be requested for the San Ramon farm.

The importance of planting abacá and cocoanuts in rows and of giving them thorough cultivation has been conclusively demonstrated on this farm, trees so planted and cultivated making far more satisfactory progress than those that were planted haphazard and worked once a year with hoes and bolos in the usual Filipino fashion. The common practice of planting camotes (sweet potatoes) between abacá plants to keep down weeds and furnish food to laborers has been shown greatly to retard the growth of the plants.

The copra raised on this farm is still dried in the crude native way. The practicability of making copra cheaply in a vacuum drier will be fully tested by the bureau of government laboratories, and should this process prove economical upon a commercial scale a suitable drying plant will be installed at San Ramon. The cocoanut husks are at present wasted or used for fuel. As soon as practicable fiber-extracting machines will be installed and a good profit should be realized on the fiber from husks.

As heretofore stated, the San Ramon Farm was in a condition of almost complete abandonment when turned over to the civil government by the military authorities. Buildings were in a state of dilapidation, parts of machinery were scattered from Zamboanga to Manila,

the plantings of cocoanuts and abacá were neglected, and cocao bushes were so overgrown with trees and underbrush that it was some time before they were even discovered.

Transportation and labor difficulties, the loss of draft animals through disease, and the unprecedented drought of last year have combined to retard the development of this valuable property, which should bring a handsome revenue to the insular government. The farm is now upon a paying basis and the cultivated area will be extended as rapidly as possible.

The government of the Moro Province has of late evinced a willingness to take over this valuable property, and General Wood recommended its transfer to the province in order that the provincial government might develop it for the purpose of growing cocoanut and abacá plants for sale to planters, it being his opinion that in this way the farm might be made of far greater practical value than it is at the present time. In the event that this recommendation was not followed, General Wood deemed it advisable for the insular government to devote at least $30,000 annually for the development and maintenance of the farm, independent of the salary of the superintendent, and that it should be administered with a view to producing in the future 1,000,000 hemp plants and 250,000 cocoanut plants annually, the hemp plants to be sold at a price not exceeding 3 cents Mexican each and the cocoanut plants at a price of 2½ or 2¾ cents Mexican each.

While the insular government was not willing to make over this property to the Moro Province, there seemed to be no reason why hemp and cocoanut plants should not be grown in any desired numbers and turned over to the provincial government for sale to planters as occasion might require. General Wood was informed that the plan for the San Ramon farm had been to increase as rapidly as might prove feasible the area planted in cocoanuts and abacá and to undertake also the cultivation of cacao upon a considerable scale, and that the raising of abacá and cocoanut plants for sale had not been contemplated for the reason that we were not informed that there was a demand for such plants in considerable quantity, but that if such a demand really existed it was evident that one of the most important functions of the farm would be to produce plants with which to meet it. It was suggested that both lines of work might profitably be carried on together for the reason that if the demand for plants exceeded expectations a draft could be made on the stock intended for use on the farm, while if the demand fell short of expectations the surplus plants, if not too numerous, could be used on the farm to good advantage. There was, of course, no room for discussion as to the desirability of furnishing such plants if the inhabitants of the Moro Province would take them, put them out, and care for them. It was felt, however, that the government of the Moro Province would best be able to determine the probable demand for plants, and in view of the fact that it had the necessary transportation for use in distributing them, the suggestion was made that after due consideration the legislative council of the Moro Province should make a definite offer to take for distribution in the province, at the price suggested by General Wood, such minimum number of each of these two kinds of plants as that body might feel certain could be disposed of during the year ending June 30, 1905, and as soon as it might

acquire the necessary information that it make a further definite offer covering the next fiscal year. The undersigned undertook to bring the production of abacá and cocoanut plants for sale to the Moro Province up to the desired number as rapidly as practicable.

General Wood did not feel that it would be advisable for the province to guarantee to take such plants from the farm for distribution among and sale to the natives, and the undersigned does not feel justified in embarking on the policy of raising for sale hemp plants by the million and cocoanut plants by the hundred thousand without fairly definite assurance that they can be sold when raised. This matter, therefore, seems likely to lie in abeyance, although orders for cocoanut and hemp plants, which responsible persons may desire to make, will be met as speedily as practicable.

In view of the wide distribution of the cocoanut palm throughout the Moro Province, the ease with which nuts may be sprouted in shady and damp places, and the heavy cost of transporting the young plants, the undersigned seriously doubts whether there would be any considerable demand for them. Should such a demand exist, however, it should be met with plants grown from carefully selected nuts, which would be likely to give trees of high productivity.

AGRICULTURAL COLLEGE AND EXPERIMENT STATION AT LA CARLOTA, NEGROS.

The construction of the new buildings for the agricultural college at La Carlota is in the hands of the insular architect, who, it is understood, will begin work at the close of the present rainy season. The farm includes about 1,900 acres of very fertile land, of which some 250 acres are now under cultivation. It is admirably adapted to the raising of sugar, and the chief of the bureau of agriculture calls attention in his annual report to the great necessity in these islands for an object lesson in up-to-date methods of sugar cultivation and extraction. The mills at present in general use are fifteen to twenty years behind the times. The entire juice, after liming and a little skimming, is boiled down to a solid mass or is stirred while hardening to make it grain, and is then called sugar. There is incorporated in this so-called sugar from 20 to 25 per cent of molasses, which must be extracted at the refinery. Three samples of Negros sugar analyzed at the bureau of government laboratories show an average of 78.7 per cent sucrose of crystallized sugar, 7.2 per cent of glucose or noncrystallizable sugar, and 1.41 per cent of ash.

FIBER INVESTIGATION.

Several good mechanics are at work on the difficult problem of producing a satisfactory machine for cleaning abacá. At least one of the machines nearing completion seems quite likely to prove fairly satisfactory. Should this be the case, the production of abacá will be greatly stimulated. The bureau of agriculture has done all it could to aid inventors by giving them practical suggestions and by furnishing them abacá stalks on which to test their working models.

Experiments as to the value for paper making of the abacá waste produced in stripping are now in progress, and large quantities of this substance will soon be sent to different paper factories for practical



PRESENT METHOD OF CLEANING ABACÁ.

Photograph by Worcester.

trial. Analyses of this waste show that it contains fiber nearly equal in weight to that contained in esparto, which is so largely used for paper making in Europe. Should it prove as good as esparto, it is not too much to say that the value of the abacá waste now annually thrown away is at least $3,500,000 gold.

Maguey, or *sisal hemp*, grows perfectly in these islands and is admirably suited to those regions where abacá can not be raised because of the long dry season. With good machinery the fiber can be extracted for a small fraction of its value. Machinery for cleaning this fiber has been ordered and will be used for purposes of demonstration.

Tree cotton grows well throughout the islands without cultivation, but seems never to have been systematically planted. The United States now imports annually more than $100,000 gold worth of this fiber, at a price of 20 cents gold or more per pound, while the seed is about as valuable for oil and fertilizer as is that of true cotton. Machinery for cleaning this cotton has been ordered.

COCOANUT-OIL PRODUCTS.

Details of the processes which have long been used in France, Germany, and England to make from cocoanut oil solid food substances resembling butter and lard have recently been obtained by the bureau of agriculture, and independent experiments bearing on this subject have been in progress for some time at the chemical laboratory. It is believed to be entirely feasible to establish an important industry here in the manufacture of this fat, which, if sold at the prices now prevailing for compound lard, would nearly double the values obtained for copra even at present high prices. Copra is now the second largest export from the islands, and the area planted in cocoanut trees can rapidly be increased very greatly.

OTHER INVESTIGATIONS.

Cassava, the sole source of the tapioca of commerce, grows all over the islands, but is little used except as a famine food. Starch is worth 4 cents per pound here and tapioca still more. Analyses made of Filipino cassava indicate that 25 per cent of its weight may be recovered in the form of pure starch or tapioca. With a suitable machine for working the roots a very profitable business might be done up to the point of supplying the home demand. Experiments in the planting of cassava have been made as a basis for further investigations.

INDIAN CORN.

Corn is somewhat extensively grown in some of the provinces, notably in Cebu and in the Cagayan Valley, in northern Luzon. It is at present usually roasted about the time it is hardening and then eaten off the cob. Less frequently it is shelled and parched or ground in rude stone mills. A crop may be matured in less than three months. The meal, pound for pound, is more nutritious than rice. The average rice crop, which requires six months to grow, does not yield more than 750 pounds of cleaned rice per acre, while the average corn crop is 15 bushels per acre, which is more than equiva-

lent in food value to 750 pounds of cleaned rice. It is apparent, therefore, that successful stimulation of corn production will greatly increase the available food supply. Some small, effective, and cheaply operated corn mills for grinding meal have been ordered for the purpose of demonstrations in the provinces.

THE CASTOR BEAN.

The castor bean grows all over the islands. Little use is made of its fruit, while much castor oil is imported, at a high price. Press cake obtained from this bean is worth approximately $20 gold per ton for fertilizer. Investigations are in progress as to the kind and cost of a milling plant which will best handle this product.

SHEEP AND WOOL.

There are now several thousand head of inferior sheep in these islands. So far as can be learned, no one here has ever sheared a sheep or sold a pound of wool. The bureau of agriculture is securing a large number of sheep shears and is distributing them among persons who will agree to use them. It is hoped that a supply of wool may be secured for export, or that the Filipinos will learn to use it as they do cotton and other fibers.

PUBLICATIONS.

The following publications have been issued during the year:

Bulletin No. 5.—List of Agricultural Products and Fiber Plants, by F. Lamson-Scribner (Spanish edition).

Farmers' Bulletin No. 4.—Preliminary Report on the Commercial Fibers of the Philippines, by John W. Gilmore. (In Ilocano dialect.)

Farmers' Bulletin No. 5.—Cultivation of Tobacco, by Clarence W. Dorsey. (Spanish edition.)

Farmers' Bulletin No. 9.—Algunas Suggestiones sobre el Cultivo del Algodonero, by W. C. Welborn. (Spanish edition.)

Farmers' Bulletin No. 10.—Maguey in the Philippines, by H. T. Edwards. (English edition.)

Farmers' Bulletin No. 11.—The Jute Industry, by W. S. Lyon. (English and Spanish editions—in hands of the printer.)

Farmers' Bulletin No. 12.—Abacá, by H. T. Edwards. (English and Spanish editions—in hands of the printer.)

Press Bulletin No. 1.—Maguey Cultivation in Mexico, by W. C. Welborn. (English and Spanish editions.)

Press Bulletin No. 2.—The White Cotton Tree, by H. T. Edwards. (English and Spanish editions.)

Press Bulletin No. 3.—Abacá Cultivation in Southern Mindanao, by H. T. Edwards. (English and Spanish editions.)

Press Bulletin No. 4.—The Relative Use of Abacá and Sisal for the Manufacture of Binder Twine, by H. T. Edwards. (English and Spanish editions.)

For further details relative to the work of the Bureau of Agriculture reference is made to the report of its chief for the year ending August 31, 1904. (Appendix L.)

PHILIPPINE WEATHER BUREAU.

Rev. José Algué, S. J., director of the weather bureau, was absent in the United States from November 20, 1903, to August 2, 1904. During much of this time he was engaged in the preparation of the weather bureau exhibit at the Louisiana Purchase Exposition. Meanwhile the affairs of the bureau were under the able direction of Rev. Saderra Maso, who served as acting director.

IMPROVEMENT IN OFFICES.

During the past year a new wing has been added to the building occupied by the weather bureau, which now has excellent quarters, affording accommodations for the director and assistant directors, as well as for observers, clerks, and other employees. With all the members of the observatory staff living within a few steps of the meteorological instruments, the operations of the Manila office are greatly facilitated.

WORK OF THE BUREAU.

The regular work of the bureau, both in the making of weather observations and predictions and in the issuing of reports, has progressed satisfactorily. Among the extraordinary publications of the year must be mentioned an English edition, revised and greatly enlarged, of the very valuable special report of the director, entitled "Cyclones of the Far East."

Ordinary and extraordinary weather reports have been sent by cable to the Asiatic coast and to Japan, as heretofore. Many special reports have been made, such as that on rainfall and evaporation, requested by Mr. Desmond Fitzgerald to aid him in passing upon plans for a new water supply and sewer system for the city of Manila.

Barometers, both aneroid and mercurial, have been adjusted, regulated, and compared with standard barometers of the observatory free of charge, and missing parts of barometers have been supplied at cost price. The astronomical department has furnished official time by telegraph to the provinces daily at 11 a. m. and to the city of Manila by time ball at noon. More than 70 chronometers have been repaired and rated during the year.

The observatory is cooperating in the international study of earthquakes inaugurated by the Second International Seismological Congress held at Strasburg last year, by sending monthly reports of the earthquakes felt in different parts of the archipelago and of the microseismic movements registered at the central observatory.

At the request of General Sanger, the director prepared a pamphlet on the climate of the archipelago, and Rev. Saderra Maso prepared one on "Volcanoes and earthquakes in the Philippines." These papers were incorporated in the Government report of the census of the Philippines, and were also printed as separate pamphlets.

The regular magnetic work has been continued at the observatory, which has also cooperated in the investigations of magnetic disturbances carried on by the chief of the German magnetic service, and has continued investigation of days of magnetic calm, in accordance with a resolution passed by the International Congress of Meteorology in 1900. Observations have also been sent to Doctor Fritz for his researches on the variation of the magnetic elements throughout the world, and the coast and geodetic survey of the Philippine Islands has been supplied with the hourly values of declination, to facilitate the work of calculating and reducing the numerous determinations made in different points in Luzon, the Visayas, and Mindanao during the years 1902 and 1903. Special observations were made during the annular eclipse of the sun which occurred on March 17, 1904.

Compasses and theodolites which have been brought to the observatory have been tested and adjusted without charge.

WEATHER STATIONS.

The number of secondary stations is the same as last year. The absence of a number of the officers of the bureau in the United States has interfered with the regular inspections of these stations, which are so useful in maintaining their efficiency. The station at Masbate, which had been rendering voluntary service since 1902, has been made official, while the third-class station at Biñang has been suppressed and in its place a fourth-class station established at San Antonio, Laguna Province, at the request of the bureau of engineering. The third-class station at Iba, Zambales, has been abolished, and Masinloc, formerly a fourth-class station, has been raised to the third class.

Eight registering anemometers have been secured for the first-class stations. The officer in charge of Benguet improvements, the bureau of forestry, the officer in charge of Government investigations relative to coal in Bataan Island, and an American school-teacher in Quiangan, Nueva Vizcaya, have been provided with meteorological apparatus on condition that they furnish certain reports to the bureau.

Difficulties have been encountered in establishing the proposed meteorological station at Guam, but it is hoped that they may soon be overcome. Meanwhile, thanks to the hearty cooperation of Governor Dyer, meteorological data of importance are obtained by mail, and news of atmospheric disturbances likely to be of importance to this archipelago is sent by cable.

EXHIBIT AT THE LOUISIANA PURCHASE EXPOSITION.

While at St. Louis Reverend Algué installed an interesting and unique exhibit and supervised the construction of an immense and admirably executed relief map of the archipelago, which has doubtless done much toward teaching the people of the United States the geography of the Philippines. Eight smaller relief maps were also installed, which gave information on different subjects, as follows:

1. The religious and political divisions of the archipelago.
2. The regions inhabited by the different races and tribes.
3. Mineral resources and mineral springs (hot and cold).
4. Forestry and agricultural products of the islands.
5. The distribution and relative frequency of earthquakes.
6. The distribution of precipitation during the month of August, which is typical of the rainy season.
7. The same during February, typical of the dry season.
8. The meteorological districts and the stations of the Philippine weather bureau.

Representations in relief of Mayon and Taal volcanoes were likewise displayed, and the work of the seismic, meteorological, and other sections of the observatory was adequately represented.

For further details relative to the work of the weather bureau reference is made to the report of the director for the year ending August 1, 1904. (Appendix M.)

THE ETHNOLOGICAL SURVEY FOR THE PHILIPPINE ISLANDS.

Practically all the field work performed during the past year by the ethnological survey has been directly connected with the prepara-

tion of an adequate ethnological exhibit at the Louisiana Purchase Exposition. A liberal sum was set aside for this purpose by the exposition board, and a large and valuable collection of ethnological objects was obtained. Much of this material will ultimately be returned to the Philippine Islands, and with a view to facilitating its return and to securing proper labeling at St. Louis a strong effort was made thoroughly to catalogue it before it was shipped. This work could not be completed on account of the shortness of the time and the great number of objects to be catalogued and labeled.

On August 13, 1903, Dr. David P. Barrows, the chief of the survey, was appointed general superintendent of education, but retained supervision over the affairs of the survey for two months, in order to close his work. Dr. Albert E. Jenks was at this time completing his paper on the "Bontoc Igorot," based on a residence of many months among this interesting tribe, but as it was anticipated that he would be ordered to the United States to help in the installation of the ethnological exhibit at St. Louis it seemed best for him to make a hasty trip to the southern islands in order to familiarize himself with the non-Christian tribes of that region, so that he might more intelligently arrange the material from this part of the archipelago.

He was also authorized by the civil governor to make direct contracts with responsible private persons for securing delegations of Manobos, Bogobos, Lake Lanao Moros, and Samal Moros for St. Louis. Acting under this authority, he arranged to secure delegations of Lake Lanao and Samal Moros and of Bogobos. It did not prove practicable to secure Manobos. An agreement was made by Doctor Jenks looking to the sending of Jolo Moros to the exposition, but as the Moros were already adequately represented by the delegations previously arranged for, the agreement was canceled by direction of the undersigned.

During this trip Doctor Jenks visited Zamboanga, Jolo, Cottabato, Davao, and Malabang, from which point he crossed the island of Mindanao to Iligan.

As the various delegations of non-Christian tribes arrived at Manila in charge of their several managers, difficulties were encountered in housing and feeding them and in preventing clashes between the several tribes. The settlement of these troubles occupied much of the time of the officers of the ethnological survey. When most of the tribal delegations were safely on their way to St. Louis, Doctor Jenks was directed to proceed there in order to aid in the installation of the ethnological exhibit and to serve on a committee which is to determine what part of the Philippine exhibit is to be returned to these islands. Upon his departure, Dr. Merton L. Miller, who had been employed by the exposition board in connection with the preparation of the ethnological exhibit, and who had been working under the direction of the chief of the survey, was appointed acting chief.

WORK OF DOCTOR MILLER.

Doctor Miller had recently returned from a trip to the northeastern and eastern part of Mindanao, where he had visited the Manobos and Mandayas of the Agusan Valley, and the interesting tribe of Mamunuas, in the Surigao Peninsula. Doctor Miller estimates the number of Mamanuas at some hundreds, but thinks it possible that it

may reach 2,000 or 3,000. Owing to their shyness and timidity, and to the fact that they live in the forest in groups of not more than four or five families and are constantly changing their place of habitation, it is difficult to form an accurate estimate of their numbers. They seem to be growing less numerous quite rapidly.

Subsequently Doctor Miller crossed Mindanao from north to south, ascending the Agusan River to its headwaters, climbing the divide, and descending the Hijo River to the south coast. In crossing the divide he passed through an almost uninhabited country over a little-used trail. The people encountered showed no hostility, but were timid and for the most part fled at his approach. After reaching the Hijo River he was deserted by all but one of his carriers, but, aided by this man and four constabulary soldiers who accompanied him, he built a bamboo raft on which he descended the river.

WORK OF MR. REED.

Mr. William A. Reed, one of the clerks or the survey, was appointed to enumerate the non-Christian tribes of Negros for the census and to make a hasty survey of these tribes. He returned to Manila on September 6, 1903, and from that time until his resignation from the bureau to accept the governorship of Lepanto-Bontoc devoted himself to completing his paper entitled "The Negritos of Zambales," except during a brief interval occupied in a trip to Zamboanga to adjust difficulties connected with the securing of tribal delegations from that island.

WORK OF MR. CHRISTIE.

On June 1, 1904, Mr. Emerson Christie was appointed to succeed Mr. Reed, the title to the position vacated by the latter having been changed from clerk to ethnologist. Mr. Christie, who has paid special attention to the study of languages, should be able to do valuable work on the native dialects in the islands. Since his appointment he has been occupied in translating and editing a series of old Spanish papers on northern Luzon and the people inhabiting this region.

PUBLICATIONS.

From the time of the organization of the bureau up to the time that the work of preparing the ethnological exhibit for the Louisiana Purchase Exposition was completed the officers and employees of the ethnological survey had spent a very large portion of their time in the field. Since the latter date they have devoted themselves to preparing for publication the results of their field work. The following papers are now in press:

"The Bontoc Igorot," by Dr. Albert E. Jenks. The pulication of this paper has been somewhat delayed from the necessity of sending the proofs to Doctor Jenks in the United States. All proofs have, however, been forwarded to him, and after they are corrected and returned work on the volume which gives a very comprehensive and valuable account of this interesting tribe will be rapidly concluded.

of this paper has been returned to the printer and it will be ready for

"The Negritos of Zambales," by William A. Reed. The page proof distribution within a few weeks.



GROUP OF BATAKS, PARAGUA.

Photograph by Miller.

"Notes on the Nabaloi Dialect of Benguet," by Otto Scheerer, who lived for many years among the Benguet Igorrotes and who is a linguist of unusual ability. This work, which has been prepared with painstaking care, contains a good vocabulary of words of the Nabaloi dialect and a brief but interesting and valuable grammar of the language.

"A Brief Report on the Bataks of Paragua," by Lieut. E. Y. Miller, governor of the province. This paper will be supplemented by further information drawn from a pamphlet by the division of military information, Philippines division, from translations of previous articles on the tribes of Paragua and from a manuscript sent to the survey by the division of military information. Lieutenant Miller secured the first photographs ever taken of this interesting and practically unknown tribe of curly-headed blacks.

"Augustinian Relations of Northern Luzon." A series of papers written at various times during the past two hundred years by Augustinian missionaries and edited by Father Angel Perez. They contain much interesting historical and ethnological matter.

History and Laws of the Moros. Early in the year 1903, 33 manuscripts, in part originals and in part copies, were purchased from Dr. N. M. Saleeby. These manuscripts deal with the history and laws of the Magindanao and Sulu Moros. By the terms of the sale Doctor Saleeby was to translate the manuscripts into English. The work of translating and editing the manuscripts has been greatly delayed. Fifteen of them have, however, been completed and are now in process of publication. It was Doctor Saleeby's desire that a part of them should be printed in Arabic characters. As there are no Arabic types to be had in Manila and as the Arabic text would be useful to specialists only, it did not seem to the undersigned wise to print them in this way. A limited number of sample pages can be readily and inexpensively reproduced by the photographic half-tone process, and this will be done.

A knowledge of Moro law, customs, and ideas, such as these translations will afford, should be very useful in dealing with the Moro tribes, and it is to be regretted that the publication of this material has been so long delayed.

Doctor Saleeby is preparing a brief account of the Moro tribes, their relationships, their languages, and the territory they occupy, which will be published in connection with these manuscripts.

ETHNOLOGICAL AND COMMERCIAL MUSEUM.

Nearly all of the material constituting the Ethnological Museum has been sent to the Louisiana Purchase Exposition, but will ultimately be returned. The work of the Commercial Museum was interfered with from September, 1903, to December of the same year by the necessary absence of Mr. Shiley in Zamboanga, where he went to aid in the preparation for publication of Doctor Saleeby's manuscripts. He has since been engaged in collecting information, answering inquiries of correspondents, who have been chiefly residents of the United States, and in the installation of exhibits. He has given a large amount of valuable and accurate information to inquiring manufacturers and exporters relative to the lines of goods suitable for the Philippines.

Early in May the museum, together with the offices of the survey, was moved into the Oriente Building, where the museum has 3,882 square feet of floor space and 1,500 square feet of wall space. About two-thirds of the floor space is occupied by cases which were made in Japan for the exposition board and which are now filled with Japanese exhibits. The remaining space is nearly all in use, and many of the exhibits now on hand can not be displayed for lack of cases to protect them. It is confidently believed that with adequate space the Commercial Museum would be able to promote the trade relations between the United States and the Philippines to an extent that would show it to be a very important institution.

NEED OF MUSEUM BUILDING.

With the return of the ethnological and other material from St. Louis and the constantly increasing demands for space in the Commercial Museum by manufacturers who desire to exhibit their wares with a view to securing trade in the Philippine Islands, the question of adequate museum space must become urgent in the near future. An adequate and properly furnished museum is one of the greatest of educators, but if it is to fulfill its legitimate ends it must be vastly more than a collection of curios. It should show the natural resources, the manufactured products, the ethnology, and the natural history of the country in such a way that he who runs may read. Every exhibit should teach its lesson, to the end that the museum may be not only a place of amusement and entertainment, but one of instruction as well.

It is safe to say that no institution in New York City is nearer the heart of the masses or reaches them more effectively than does the American Museum of Natural History, and the important part which the Philadelphia Commercial Museum has played and is playing in increasing American trade is too well known to require comment. This government has already made extensive and valuable collections of ethnological material; agricultural products and manufactured goods; woods, gums, resins, and other valuable forest products; rocks, minerals, birds, animals, insects, and plants. An abundance of material is on hand for the installation of valuable and instructive exhibits, but there is no suitable place in which to show them, and adequate facilities can not be provided except by construction. In the opinion of the undersigned this difficulty should be met as soon as the state of the insular finances will permit, by the construction of a wing connected with the new building of the bureau of government laboratories. Such a wing might be small at first, but the principle adopted in planning the American Museum of Natural History should be followed. The building of the latter institution had small beginnings; when completed it will cover a large city block and will be the finest museum building in the world. As increasing collections have demanded more space, and as increasing funds have rendered further construction possible, every stone has been laid in accordance with plans perfected before ground was broken, and each addition has meant one more step toward the completion of the perfected building.

While it is useless to expend money in the erection of exhibition halls which are to stand empty for years awaiting the gathering and installation of collections, yet a good museum must grow or die, and

plans for a building to house it should be of such a nature as to allow of extension when extension becomes necessary. The wing suggested might, after being sufficiently prolonged to the northward, be later supplemented by one extending to the eastward, and when further space was necessary by a third extending to the southward and joining the main building, so that the space at present occupied by the power plant would be converted into an inclosed court. This would allow of adequate lighting, without which the exhibition rooms of a museum are practically useless.

For further information relative to the work of the ethnological survey and of the Museum of Natural History and Commerce, reference is made to the report of the Acting Chief of the Survey. (Appendix N.)

DEAN C. WORCESTER,
Secretary of the Interior.

The PHILIPPINE COMMISSION,
Manila, P. I.

APPENDIX A.

REPORT OF THE COMMISSIONER OF PUBLIC HEALTH.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PUBLIC HEALTH,
Manila, P. I., September 15, 1904.

SIR: Pursuant to the requirements of Act 157, providing for the establishment of a board of health for the Philippine Islands, and in accordance with special instructions received from the Secretary of the Interior, I have the honor to submit my second annual report, which, unless otherwise stated, covers the operations of this bureau for the year ending August 31, 1904.

The law prescribes that the insular board of health shall have general supervision over all the interests of the public health in the Philippine Islands, and shall especially study their vital statistics, and shall make inquiry and investigation into the causes, pathology, and means of preventing diseases, especially epidemic diseases, including those of domestic animals, together with the sources of mortality and the effects of localities, employments, conditions, habits, foods, beverages, and medicines on the health of the people, and into the chemical composition and medicinal properties of the minero-medicinal waters of the archipelago; disseminate useful information upon these and other kindred subjects among the people; draft and recommend to the central legislative body suitable sanitary laws to control offensive and dangerous industries and occupations, and laws for the extention of the service of the insular board of health in the several departments, provinces, and municipalities of the Philippines; cause to be prosecuted all violations of sanitary laws; make and enforce regulations for the prevention and suppression of contagious or epidemic diseases of man or animals; abate nuisances endangering the public health; remove the cause of any special disease or mortality, and serve as the local board of health for the city of Manila. The board has endeavored to cover the field as completely as possible, but the matter of the prevention and suppression of diseases, especially those of an epidemic character, has been given preference. In my report for last year, I said:

> The matter of the prevention of disease should be viewed from two standpoints—the humanitarian and the economic. Too often the inseparable relation between good health and business prosperity is overlooked. Sentiments of humanity and practical business interests are equally concerned in averting preventable disease and should unite for the proper sanitary laws with respect to the wilful, the indifferent, or the ignorant. Not only do the sanitary authorities require full moral support in carrying out their work, but ample legal authority to enforce necessary orders, and sufficient funds to pay for securing the desired improvements are essential. Modern sanitary requirements unquestionably cost money, but any expenditure that prevents disease and improves public welfare should be regarded as an investment yielding the largest returns, not only in respect to improved

health and happiness, but also as an insurance of industrial prosperity which is directly measurable by dollars and cents.

For the above reasons, the fact should be emphasized that in any community, and especially in these islands, the governmental economy should begin elsewhere than in the sanitary department, and improved sanitary conditions should not be an occasion for decreased appropriations. Improvement in health conditions is permanent only while proper sanitary measures are being applied. While the tremendous money loss directly depending upon preventable disease in these islands during the past two years is beyond calculation, it is safe to say that it would have supported a most thoroughly organized and completely equipped sanitary organization for the Philippine Archipelago for an entire generation. Sanitary efficiency is the key to the prosperity of these islands, and thus to the success of their administration; in its absence every walk in life will be unfavorably affected and the work of every other department of the government will be curtailed for lack of revenue. The interests of humanity, industry and commerce thus unite to bespeak of the authorities a most liberal financial and moral support for the sanitary department.

The efficiency of a board of health depends to a great extent upon its financial resources. A board of health operating in the Philippine Islands with only advisory functions, possessed of no mandatory powers, would be of very little practical value, and as a working organization, very defective. Municipal boards of health, as contemplated and established under Act 308, have demonstrated the wisdom of the law whenever and wherever they have received proper support, which may, under existing laws, be supplied or denied by municipal councils, which in many cases look with distrust, if not with disdain, upon the efforts of other authority-exercising boards. Work that is wholly in the interest of the municipality in which it is needed should be paid for by the residents of such municipality and not by the provincial or central government, and the law should be sufficiently mandatory in its character to compel the employment of a certain number of sanitary officials in every municipality in the Philippine Islands. If the financial condition of a municipality will not permit this to be done, funds should be supplied by the province or by the central government.

The whole matter of public hygiene in the Philippines, as elsewhere, involves a conflict of interests, and when a municipality or the central government takes effective measures to prevent or suppress a disease, dissatisfaction and opposition on the part of some person or persons who are interfered with or inconvenienced by the measures employed will soon find active expression. The public interests are vague, faraway considerations usually, until they become private interests—until they disturb the personal comfort or make demands upon private incomes.

Public sanitation is rapidly taking a prominent position among the exact sciences. Some of the greatest minds in the scientific world are engaged in its study and development. The pressing problem of the day, especially in the Philippine Islands, is how we can most effectively and successfully apply this science, which is in advance of its practical application. It is evident that systematic health organizations are essential to satisfactory results, but the law governing them should be flexible enough to meet the varying circumstances and conditions of the communities or municipalities in which it is to operate. The jealously guarded independence of the municipalities necessarily obstructs the unity of purpose and concert of action between health boards and municipal officials, which are so necessary to the accomplishment of the best results.

The old adage "In time of peace prepare for war" is nowhere more applicable than to boards of health.

An important feature of board of health work is the collection and classification of vital statistics in order that they may be useful, not not only to the student of sanitation, but also to the student of other branches of social science, who finds in them an accurate index to many characteristics of the people to whom they pertain.

BIRTH STATISTICS.

It is practically impossible to obtain reliable statistics of births in the Philippine Islands. In the city of Manila it has been very difficult to secure even incomplete returns, but the constant efforts of the board of health have not been without results, and it is hoped that in the next annual report the board of health may be ready to give accurate and uniform statistics upon this subject, without which it is impossible to determine the approximate increase in the population and many other facts of statistical interest.

With this purpose in view, the board has adopted a uniform birth certificate, printed in both Spanish and English, in which the following information is asked for: Name of child; date of birth; place of birth; living or stillborn; sex; nationality; legitimate or illegitimate; name and birthplace of father; age of father; name and birthplace of mother; age of mother; occupation of father; number of children borne by mother, including present birth; remarks; name of person reporting birth; with or without medical assistance.

It is a provision of nature that in all countries where evolution has not expended its force that a certain ratio is maintained between the number of births and the number of deaths. When the birth rate is high the death rate may be expected to be high also. This statement apparently holds good in the Philippine Islands, though it is impracticable to present reliable statistics in support of it at this time.

The Filipinos are a child-producing race; perhaps no people in the world are greater opponents of "race suicide," yet over 50 per cent of children born in the city of Manila never live to see the first anniversary of their birthday. The board of health has begun a campaign of education against the causes which are responsible for the great sacrifice of life. Health bulletin No. 3, published elsewhere in this report, prepared by a committee of physicians appointed by the board of health, has been translated into the principal dialects of the archipelago and given general circulation among the people.

BIRTH RATE FOR THE CITY OF MANILA.

The number of births reported during the year in the city of Manila was 6,341, which gives a rate of 28.83 per 1,000 upon a population of 219,941. An effort has been made to obtain accurate statistics with regard to the number of children born in the city of Manila, but, owing to the fact that physicians or registered midwives are summoned in a relatively small number of cases, the returns are very incomplete. There has been a great improvement in this respect during the last eighteen months. The most reliable sources of information are the baptismal records of the Catholic churches, but since the Independent Catholic Church was organized under the leadership of Señor Aglipay the names of many chlidren do not appear upon the records of the churches of Manila.

The births[a] per year are classified as follows: Filipinos, 6,182; Spaniards, 40; Americans, 61; all others, 58.

There are very few Chinese women in the city. The children of those Chinamen who have married Filipino women are reported as Filipinos.

A greater part of the American and other white population is composed of single men, a fact which will explain the small number of births which have occurred among the white inhabitants. However, the number of American children born in Manila during the fiscal year is 61, as compared with 47 for last year, which apparently indicates that the number of American families in the city is increasing.

DEATH RATE.

The mortality statistics of the city of Manila are calculated upon the official census returns of 219,941, composed of 189,782 Filipinos, 22,125 Chinese, 4,389 Americans, and 3,645 foreigners.

There were 10,781 deaths among residents during the year, which gives a death rate of 49.01 per 1,000. Of this number 376 were caused by cholera, 84 by plague, and 25 by smallpox. The death rate by nationality per 1,000 was: Americans, 9.34; Filipinos, 53.72; Spaniards, 15.42; other Europeans, 16.11; Chinese, 21.85; all others, 17.88. Of the total deaths occurring in the city 5,998 were males and 4,782 females.

The following table of deaths, including those of transients, will give the classification with respect to age:

Under 30 days	1,213	30 years to 40 years	879
From 30 days to 1 year of age	4,901	40 years to 50 years	599
1 year to 2 years	549	50 years to 60 years	451
2 years to 5 years	450	60 years to 70 years	306
5 years to 10 years	151	70 years to 80 years	192
10 years to 15 years	105	80 years to 90 years	96
15 years to 20 years	313	90 years to 100 years	42
20 years to 25 years	442	100 years and over	20
25 years to 30 years	604	Unknown	44

The relative death rate by districts in the city of Manila is as follows:

Districts.	Death rate per 1,000.	Districts.	Death rate per 1,000.
Walled City	44.40	San Miguel	47.29
Binondo	45.86	Paco	78.51
San Nicolas	29.42	Ermita	23.47
Tondo	78.14	Malate	59.60
Santa Cruz	46.20	Pandacan	64.21
Quiapo	54.17	Santa Ana	54.37
Sampaloc	64.50	Transient residents	36.22

The lowest death rate was in the district of Ermita, the residents of which are composed of a large number of white people and of the better class of natives. The districts which have a relatively large Chinese population, like San Nicolas and Binondo, show a much lower death rate than those districts densely populated by the poorer class of natives. This may be explained in part by the fact that the

[a] Estimated number of births, 13,000.

Chinese population consists principally of males, the greater number of whom are unmarried, thus eliminating the high infant mortality that plays such an important part in those districts populated by the poorer class of Filipinos.

DEATH OF TRANSIENTS IN THE CITY OF MANILA.

In the city of Manila there were registered 576 deaths of transients. As the transient population does not enter into the census returns, the deaths occurring in this class are listed separately. Manila is the business center of the islands and has at all times a large transient population. The Philippine Civil Hospital and the San Juan de Dios Hospital receive many patients from the provinces. It will be observed that most of the deaths among transients are due to acute diseases, the exception being generally those who are brought to the hospitals in the last stages of chronic diseases for treatment.

PRINCIPAL CAUSES OF DEATH.

The more important causes of death in the city of Manila were as follows:

Convulsions of children	3,541	Affections of the stomach (cancer excepted)	75
Tuberculosis	1,153	Puerperal septicæmia	70
Acute bronchitis	549	Angina pectoris	64
Eclampsia (nonpuerperal)	534	Acute nephritis	54
Chronic diarrhea and enteritis	526	Malnutrition	52
Chronic bronchitis	489	Asthma	49
Asiatic cholera	423	Puerperal hemorrhage	49
Simple meningitis	416	Diarrhea and enteritis (2 years and over)	44
Congenital debility, icterus, and sclerema	379	Chronic rheumatism	40
Dysentery	319	General paralysis	38
Beriberi	318	Accidental submersion	38
Intermittent fever and malarial cachexia	181	Accidental traumatism	37
Senile debility	173	Broncho-pneumonia	34
Diarrhea and enteritis (under 2 years)	162	Acute endocarditis	34
Pneumonia	147	Pulmonary congestion	33
Organic disease of the heart	126	Variola	32
Cerebral congestion and hemorrhage	114	Affections of the arteries	30
Typhoid fever (abdominal typhus)	113	Cirrhosis of the liver	26
Bright's disease	102	Leprosy	25
Tetanus	96	Anæmia	25
Plague	87	Hernias (intestinal obstructions)	24
Special diseases of early infancy	76	Simple peritonitis	20

DEATHS WITHOUT MEDICAL ATTENDANCE.

Of the 11,357 deaths, excluding stillbirths, which occurred in the city of Manila during the year among residents and transients, 52 per cent are reported to have occurred without medical attendance. This is due largely to the fact that many poor people do not know that medical attendance may be obtained free of charge from the Chinese and Filipino physicians, and that prescriptions received from these physicians may be filled without cost. Besides, there is an inherent fatalism, amounting to indifference, that characterizes the native mind and causes it to distrust the efficacy of medicines.

Scientific medication has no physiological significance to a people who believe that disease is the result of the influence of evil spirits.

In the last stage of disease, when it is evident that the patient can not live, a physician is often summoned, more to secure his signature to the death certificate, which will save his relatives or friends in securing permission to inter the body, than for the purpose of aiding the patient. All this will be changed in the course of time, for evolution is going on in the Philippines as it is in every part of the world. There are many conscientious native practitioners whose influence will eventually bring about confidence and dispel superstition. Then, and not until then, will they learn to have more faith in cleanly habits, pure water, wholesome food, and attention to the laws of nature than in the charms that they wear round their necks.

INFANT MORTALITY.

The total number of deaths, including transients, in the city of Manila for the year ending August 31, 1904, was 11,357, of which 6,029 were infants under 1 year of age.

While a high death rate among infants is common to all tropical countries, it can not be ascribed to the climatic condition alone.

In the Philippine Islands the primary cause seems to be due to lack of knowledge of the proper care and feeding of young children, and to the difficulties of obtaining suitable food in cases where it is necessary to supplement the natural food by resorting to "artificial feeding." Into all the larger towns of the archipelago the germ-infected nursing bottle has found its way, but fortunately it has not yet become an important factor among the causes of infant mortality. It is almost impossible to obtain fresh cow's milk, so the milk of the carabao and the goat is used. The poor people, especially in the provinces, can not avail themselves of ice, therefore it is impossible for them to preserve the milk in a fresh state, and it is often fed to infants after it has become sour. They know nothing of the necessity for making it conform as nearly as possible to breast milk, nor of the importance of protecting it from flies.

Throughout the Philippine Islands dishes are washed in cold water, and the nursing bottle, if in use, is treated in the same way, if it is fortunate enough to be washed at all. On account of the destructive epidemics of rinderpest, which have destroyed the cattle, many of the goats have been sacrificed for food, so it is necessary to use condensed milk, and oftentimes, in the provinces, the milk of the cocoanut, for feeding infants. The ignorant classes do not understand why water taken from a stream in which people bathe and wash their clothes, when used to dilute milk, should cause intestinal disorders, or why an unclean cloth used in dressing the umbilical cord at the time of birth should infect the child.

The Filipino people are fond of their children, and, like the Chinese, they consider it an honor to have large families. Such a thing as an induced abortion or miscarriage is very rare. The native physicians have displayed great interest in the circulation of the board of health bulletin No. 3, mentioned elsewhere, entitled "The Care of Infants." It is sincerely hoped that much good will be accomplished through its influence, but it will require time and a carefully conducted campaign of education to overcome the present conditions.

BURIALS AND DISINTERMENTS.

During the year there were 11,627 dead bodies disposed of, 7 being shipped to the United States, 3 to the provinces, 204 cremated, and 11,412 buried in the various cemeteries of Manila. One body, that of a child, stillborn, was preserved in alcohol by permission of the board of health.

There were 420 disinterments in the city, of which number 100 were from the government cemeteries, 229 from the Chinese cemetery, and 91 from other cemeteries.

Besides the remains of the 229 Chinese shipped from Manila to China for final interment, the remains of several Chinamen, buried in the provinces, have been disinterred and taken back to China in accordance with the customs of these people.

The regulations of the board of health require that five years shall have elapsed before the disinterment of the remains of deceased persons who have been buried without being embalmed, except in special cases, when permission may be given after a burial of two years. The commissioner of public health has under consideration a bill to regulate the disinterment and shipment of the dead, which has for its purpose the establishment of a uniform law for the government of this important matter.

MORGUE.

The board of health morgue and crematory are connected with the San Lazaro Hospital. During the year there have been received 634 bodies, 430 being disposed of by burial, and 204 by cremation.

One hundred and ninety-five autopsies were held for the purpose of determining the cause of death.

INSANITARY HABITS.

The Filipino people possess many habits of cleanliness. They are fond of bathing and of the use of perfumes and cosmetics, but the lower class practice many insanitary habits which are the result of their oriental customs and their absolute lack of knowledge of the nature and cause of disease.

On account of the mildness of the climate and the simple way in which the food is prepared, the greater number of houses are without facilities for heating water; therefore dishes that are used at one meal are left over until the next before any attempt is made to wash them. In the meantime flies, dogs, chickens, and such other animals as are interested in the process have done most of the work, and a few dashes of cold water do the rest. Even among the better classes, and in the homes of many Americans, this kind of work is left to the care of "muchachos," who display remarkable zeal in avoiding exertion whenever it is possible.

This condition may be responsible for the appearance of amœbic dysentery in those cases where every apparent sanitary precaution has been observed.

Racial habits and customs which have prevailed through centuries can not be changed in a few years, but it is possible to improve them and this has been done to some extent. This matter is largely a work of education of future generations, the success of which

depends upon the instruction received in the public schools, and upon example, rather than upon the direct efforts of sanitary officials.

PUBLIC BATH HOUSES AND LAUNDRIES.

This is a very important subject, and was discussed at some length in my annual report for last year, in which I called attention to the urgent need of the establishment of these institutions in order to meet the requirements of those who at present have no other place than the esteros to go for the purpose of bathing and for washing clothing. It is evident that bathing in polluted waters is responsible for many diseases of gastro-intestinal nature. During the epidemic of cholera the frequency of cases of this disease among laundresses, and among others whose occupation brought them in contact with the waters of the esteros and rivers, is conclusive that these waters are responsible for much sickness. The washing of clothing in such polluted waters is insanitary, to say the least of it, and it may be the means in many instances of conveying the germs of "dhobie itch," and other skin diseases, and even of amœbic dysentery. The recommendation is renewed that there be established a sufficient number of public laundries, supplied with clean water, at which work may be safely done. It is desirable that they should be supported by municipal funds, and that no charge be made for their use. These bath houses and laundries need not be expensive to be serviceable.

ESTEROS.

An effort has been made by the street department of the city, and by the board of health, to relieve the esteros of as much filth as possible, but still they are filthy.

They were formerly used as open sewers into which excreta, garbage, the waste of factories, and other impurities found their way, and became a menace to the public health and offensive to sight and smell. Until the new sewer system is completed they will continue to serve a necessary purpose. The operation of the pail conservancy system has done much to relieve the situation by permitting the removal of many privies located over esteros, and the installation in their stead of pails which could be kept in a reasonably sanitary condition; and also by the use of septic tanks placed so as to intercept the contents of private drains, thus relieving the water of a considerable portion of impurities before it reached the esteros. To prevent the discharge into the esteros of waste from manufacturing establishments at this time would practically break up many of these concerns. To remove all privies emptying into esteros in the absence of suitable provision for disposal of the excreta, would result in a more general soil pollution, which would be more dangerous to public health than the additional amount of noxious material dissolved in the already polluted waters of the esteros, and for this reason the board of health has exercised more leniency than a hasty consideration of the subject would seem to justify. In the season of rains these esteros are flushed by the large volume of storm water which surges through them on its way to the Pasig River, by which it is conducted into the bay. During the dry season the conditions are more serious, as practically no clean water ever finds its way into them. The tides exert very little beneficial

influence on account of the length, narrowness and tortuous courses of the esteros. The rising tide forces the foul water remaining after ebb tide upstream toward the ramifications. As stated in my report for last year, the falling tide sweeps out the cleaner water which has been brought in from the river, and the filthy water from the upper part of the stream follows down through the business portion of the city, attended by all its disagreeable odors and unhealthful emanations. About the time that this foul water begins to escape into the river the tide turns, and the contaminated water is again forced into the esteros without having had an opportunity to pass out. This condition of affairs continues day after day, the water simply changing its position from one part of the estero to the other, without compensating dilution to offset the constantly increasing pollution. As the dry season advances its condition becomes worse, and is relieved only by the return of the wet season.

These esteros are of considerable commercial importance, as they afford ready access by water to all parts of the city. They afford also employment to a great number of poor people who are engaged in boating and rafting. It would be a great mistake to fill them in. They should be improved and deprived of their insanitary qualities in order that they may be a blessing and an ornament to the city. Dr. E. L. Munson, captain and assistant surgeon, U. S. Army, who was formerly on duty with the bureau as assistant to the commissioner of public health, devised a plan which has commended itself to all engineers to whom it has been submitted. This plan, suggested by Doctor Munson, briefly, is to so control the tidal action in the esteros as to cause a constant movement of the water therein toward the lower portion of the Pasig River, with discharge into the same on the ebbing tide, while the esteros fill up during the rising tide with water drawn from relatively clean sources. This is to be accomplished by outflow gates at or near the mouths of esteros and inflow gates near their heads, thus preventing any escape of the clean water except from the river as the tide rises. Three short inflow flushing canals would have to be excavated to perfect the operation of the system throughout the city. The permanent improvement of the esteros would necessitate the construction of valve gates of solid construction in order to insure the purifying movement of water through the esteros with each tide. The esteros should be strengthened whenever practicable, walled up with stone on the sides to a proper width, and dredged to a uniform depth of at least 4 feet at low tide, so that mud banks would never be exposed.

These esteros should be kept free from the obstruction of stored logs and bamboo which is now permitted. An ordinance has been prepared by the board of health for this purpose and forwarded to the municipal board.

LOW LANDS.

Under authority of Act No. 1150 the board of health has drafted a suitable ordinance for the purpose of causing owners or agents of such property to begin the work of filling in, so that the work may be carried on gradually without inflicting financial hardships. The ordinance as drafted reads as follows:

Water flow not to be obstructed.—No person shall deposit on any street, alley, private or public place in the limits of the city, or upon any paved street now or hereafter constructed,

any dirt, brick, or other material, in such manner as to obstruct the free flow of water along any ditch or gutter.

Offensive substances not to be used.—No animal or vegetable substance or any street sweepings, muck, or silt, or dirt gathered in cleaning yards, buildings, esteros, docks, or slips, or waste of mills or factories, or any materials which are offensive, or tend by decay to become putrid, or to render the atmosphere impure or unwholesome, shall be deposited or used to fill up or raise the surface or level of any lot, grounds, dock, wharf, or pier, in or adjacent to the built-up portions of the city, or any ground filled for the purpose of building thereon, unless pursuant to a special permit from the city engineer and approved by the commissioner of public health.

Buildings on insanitary sites not to be occupied.—No building or structure shall be used as a residence or place for human habitation or abode which is situated upon land which has been made by filling in with dangerous and insanitary refuse, garbage, or other substance which may have an unfavorable effect upon the public health.

Where any premises within the limits of the city are composed of low land, or so excavated or walled, diked, or dammed as to admit or cause the formation on the surface thereof of pools, ponds, or stagnant or other foul waters which are a nuisance and a menace to the public health, the city engineer may call upon and require the owner of any premises whereon such pools may exist to fill up the same with good clean earth or other approved material to the level of the surrounding ground, or to drain off such pools by means of surface drains into any channel with which such surface drains may lawfully communicate, or to cut or breach any retaining walls, dike, or dam so that such retained water may have free escape.

Procedure.—Whenever it shall come to the knowledge of the board of health that any low land, marsh, or stagnant pool or pond in the city of Manila is in an insanitary condition and constitutes a serious menace to the public health, it shall report the facts to the city engineer, who shall take steps to cause the said low lands, marshes, stagnant pools, or ponds to be cleansed, drained, or filled in and the insanitary conditions removed; provided that no order for the cleansing, drainage, or filling in of such low lands, marshes, stagnant pools, or ponds involving a cost of more than 300 pesos, Philippine currency, shall be effective without the approval of the secretary of the interior, as provided for in Act 1150.

MOSQUITOES.

Mosquitoes find favorable breeding places in the sunken lands and esteros of the city. It is of the utmost importance that active steps be taken to minimize their number by the use of every means known to science.

Fortunately, the mosquitoes which carry the infection of malaria are relatively few. The prevailing species found in Manila and along the coast lands belong to the Stegomyia variety, which have been shown to be the agents of transmission of yellow fever in Cuba. The infection of yellow fever has never been introduced into the Philippine Islands. It is true that infected mosquitoes live several months, but it is probable that they can not survive a journey around Cape Horn from the West Indies or Brazil. It is also probable that they would die before they could be brought in on a sailing vessel from the west coast of Central or South America. The immunity of the Philippines may be due in some measure to the fact that very little direct trade has been carried on between the Orient and those coasts where yellow fever is endemo-epidemic.

The new Panama Canal, affording as it will more rapid communication between infected countries and the East, may complicate the sanitary problem in the Philippines. The situation at least will be important enough to justify the fumigation of every vessel that passes through the canal before it is allowed to proceed on its journey and the enforcement of such active prophylactic measures as may be indicated by the probable danger of transplanting the infection into the Philippine Islands.

The board of health has begun active measures to lessen the number of these annoying and disease-bearing insects in the city of Manila.

MALARIAL INFECTION.

Very fortunately, diseases caused by malarial infection are not as common or as dangerous in the Philippines generally as in many parts of the United States. The mosquito, now recognized as the agent for the transmission of malaria, apparently does not find as favorable environment for development as it does in many other tropical countries, and in some portions of the United States, due perhaps to the fact that the greater part of the population live along or near the seacoast. In the interior there are many malarial districts where the malaria-bearing mosquitoes are found in large numbers; this being especially true of the southern islands, where the disease is of a severe type. The natives know the value of quinine and laxatives in these diseases. In Manila for the year ended August 31, 1904, there were 181 deaths recorded as due to malarial causes.

DYSENTERY.

This is the most dreaded and one of the most dangerous of tropical diseases. It is clearly established, at least so far as Manila is concerned, that the disease is mainly water borne. Repeated examination of the city water reveals the presence of amœbæ. In its relation to the present water supply, the question has been thoroughly studied by Mr. Desmond Fitzgerald, of Boston, the eminent sewer and water expert, who has been in Manila in connection with a new system of waterworks. Mr. Fitzgerald was taken sick with the disease three days after his arrival in the city. This fact led him to give more attention to the subject than he probably would have given if he had not had this experience. It is his opinion that the new water system, with its improved facilities for purification, will exert a favorable effect toward lessening the number of cases of this dangerous disease.

The mind of the Filipino servant is not sufficiently enlightened to enable him to recognize the danger of drinking water that has not been sterilized, and the necessity for boiling the water used for toilet purposes is still more unthinkable to him. Even when, at the price of eternal vigilance, he is made to do these things, it is safe to say that he uses nonsterile water for washing the glasses in which the water is served. Those who have given the subject careful study hold the opinion that amœbæ may be introduced into the system in this way and by the use of the water from the shower bath. This will explain the origin of those cases which have occurred in persons who have exercised the most watchful care in other respects.

During the year there were 319 deaths from this disease in the city of Manila. Many cases yield to quinine enemata, while in others it is necessary to go to America or Japan in order to obtain the benefits of a cooler and more healthful climate.

BERIBERI.

Beriberi is one of the least feared and, next to tuberculosis, among the Filipinos and Chinese, particularly the poorer classes, one of the most dangerous diseases in the Philippines.

White people are not very susceptible, though a number of American beriberi patients have been treated in the civil hospital. The death records of Manila show that 318 persons have died in the city

of Manila of this disease during the last year. The greatest number of deaths takes place in the provincial jails.

Whatever may be the true etiology of the disease, it is certain that a diet deficient in nitrogen is an important predisposing cause, though cases have been known to occur in persons where no predisposing factors could be determined.

Sunlight, fresh air, cleanliness, and a nitrogenous diet are enemies of the disease and in many cases exert a curative effect.

LEPROSY.

The number of lepers in the Philippine Islands has been variously estimated from 10,000 to 30,000. It is probable that there are not more than 5,000. This office has a record of 3,632. At present only 457 are cared for in leper institutions; 225 in San Lazaro Hospital, Manila; 209 in the San Lazaro Leper Hospital at Cebu, and 23 in the Palestina leper colony near Nueva Cáceres, in the province of Ambos Camarines.

The type of leprosy prevalent in the Philippine Islands is relatively mild as compared to the character of the disease in many other countries. Of the 227 lepers who have occupied San Lazaro Hospital in the city of Manila during the year only 26 have died.

The board of health has submitted a bill for an act entitled "An act providing for the segregation, treatment, and care of lepers in the Philippine Islands," the principal features of which are set forth in eight sections, as follows:

SECTION 1. There shall be established on Culion Island, under the direction and control of the board of health for the Philippine Islands, a colony for the segregation, treatment, and care of all persons in the Philippine Islands who are now afflicted with or may hereafter become afflicted with leprosy.

SEC. 2. The board of health for the Philippine Islands is hereby authorized to take possession of Culion Island and such other islands as may hereafter be reserved or set apart for that purpose by the Philippine Commission, for the establishment of a colony or colonies for the separation and care of the lepers of the archipelago, and, subject to the approval of the secretary of the interior, to make, promulgate, and enforce such rules and regulations as may be necessary for the efficient control and management of such colony or colonies, and all said rules and regulations shall have the same force and effect as statute laws enacted by the Philippine Commission.

SEC. 3. The officer in charge of the leper colony or leper colonies shall be designated as the governor of the leper colony or colonies of the Philippine Islands, and he shall have in addition to his other powers those of a justice of the peace.

SEC. 4. The board of health for the Philippine Islands, through its proper agents, is authorized to place and confine in Culion leper colony, or in such other colonies as may hereafter be established in the archipelago, all persons resident of the Philippine Islands who are found to be suffering with leprosy and all persons who may hereafter become afflicted with that disease: *Provided*, That no person shall be transported to the leper colony until examined and reported in writing to the commissioner of public health or his duly appointed representative to be a leper by a board of three physicians, duly qualified under the provisions of Act 310, regulating the practice of medicine and surgery in the Philippine Islands, and authorized to make such examination by the commissioner of public health: *And provided further*, That every person who is received at the Culion leper colony, or such other colony as may be established hereafter, shall again be thoroughly examined by the medical officer in charge before final commitment as a leper.

SEC. 5. It shall be unlawful for any person who is not a leper to land at or visit any leper colony, unless he be a member of the board of health for the Philippine Islands or a person who has duly received written permission from the board of health for the Philippine Islands or its proper agents. Any unauthorized person found within the limits of a leper colony shall be arrested and delivered to the proper authorities.

SEC. 6. A reasonable amount of labor may be required from all indigent lepers confined in such colony who are physically and mentally able to labor: *Provided*, That no person under 12 years of age or over 60 years of age shall be required to perform such labor.

SEC. 7. There shall be established and maintained in connection with the leper colony a branch laboratory for the investigation, study, and treatment of leprosy, under the direction of the superintendent of the bureau of government laboratories.

SEC. 8. All leprous patients confined in colonies by the board of health for the Philippine Islands or its proper agents who are nonsupporting shall be fed, clothed, and maintained at the expense of the insular government, unless the relatives of such patients, or others, voluntarily contribute to their support.

The work on the leper colony at Culion is progressing satisfactorily and it is hoped within a short time the work of transferring the lepers to this colony will be begun. The government has purchased the property of the natives of Culion in order that the lepers might have homes.

Dr. Charles F. de May, who has been selected to fill the position of superintendent, has had considerable experience in the Tropics, and has the advantage of being able to speak Spanish well, besides having a valuable acquaintance with the customs and peoples of the Orient.

The new colony will be a comfortable home where these unfortunate people may live as happily as it is possible for lepers to live.

The formal opening of the Culion leper colony will mark the beginning of a new order of things in the treatment of these unfortunate people, who, notwithstanding their condition, have certain inalienable rights that society must respect.

SMALLPOX AND VACCINATION.

During the year ended August 31, 1904, there were 73 cases of smallpox in Manila, with 32 deaths, as shown by the following table:

Date.	Americans.		Filipinos.		Foreigners.		Chinese.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1903.								
September	1	1	1			1		
October			1					
November	2	1	1	1				
December	2	3	2					
1904.								
January	2							
February								
March	1		7	1			2	
April	2		14	5	2	1		1
May	10	2	10	6				
June	1	2	5	2				
July			2	1	1			
August			4	4				
Total	21	9	47	20	3	2	2	1

There have been no deaths among those who have been protected by vaccination.

Several provinces have reported outbreaks of smallpox, but nowhere has the disease got beyond the control of the health authorities. The board of health has kept a force of vaccinators in every province of the archipelago. In my report for last year I called attention to the fact that from the 3d of November, 1894, to the 25th of October, 1898, the latter being the date on which the administration of the government was taken by the Americans, a total of but 9,136 vaccinations had been made in Manila, while in the months of November and December, 1898, there were 10,477 vaccinations performed in the city of Manila, or 1,341 more people vaccinated in the first two

months of the American administration than during the last five years of the Spanish Government.

The number of vaccinations performed in the city of Manila during each year of the American occupation is as follows:

1898 (two months)	10,477	1902	133,803
1899	103,931	1903	148,714
1900	60,592	1904	151,463
1901	73,891		

The work of vaccination is carried on under the direction of Señor Saturnino Espejo, chief vaccinator for the Philippine Islands. Señor Espejo has occupied this position for many years, having been employed under the Spanish Government. There have been no serious results, so far as known, from any vaccination, a fact which testifies to the careful manner in which the vaccine is prepared at the laboratory and to the precautions observed in performing the operation. All operators are carefully trained by Señor Espejo before they are sent out.

The vaccination work was carefully systematized by Dr. Edward L. Munson, captain and assistant surgeon, U. S. Army. Captain Munson's plans for conducting the work are so comprehensive and efficient, involving, as they do, a scheme to vaccinate a nation of over 7,000,000 people, it is thought advisable to publish them in full, that for the city of Manila being given first.

CIRCULAR ON VACCINATION FOR THE CITY OF MANILA.

The following information is published for the guidance of all concerned, and will hereafter govern the work of vaccination and the maintenance of records and rendering of reports thereon for the city of Manila.

The supervising vaccinator.—The supervising vaccinator will be held responsible for the efficiency and attention to duty of vaccinators and persons assigned as inspectors of vaccinations. He will see that all vaccinators render to him daily reports on the prescribed form, and will forward to the commissioner of public health consolidated reports, as elsewhere specified, based thereon. He will personally inspect, or cause to be inspected, the work of the vaccinators as to the success of vaccinations done by them, and for this purpose he is entitled to receive such assistance in the work of inspection of vaccinations from the sanitary inspectors of his districts as may be practicable. He will be responsible for the proper instruction of persons serving on probation with a view to appointment as vaccinators.

Assignment of vaccinators.—A total of 15 vaccinators is authorized for the performance of vaccination work in the city of Manila. These will be distributed on the basis of the population of the sanitary districts to which assigned. Ordinarily the assignment of vaccinators to sanitary stations will be as follows: Station A, 3; Station C, 2; Station F, 1; Station G, 3; Station I, 2; Station J, 1; Station L, 2. The remaining vaccinator will be assigned as assistant to the supervising vaccinator, for the purpose of assisting in the inspection of vaccinations and for detail in emergency as vaccinator. Where two or more vaccinators are on duty in a district, one will be placed in charge of the others by the supervising vaccinator, and will be responsible to the latter for the efficiency of his subordinates.

With the approval of the commissioner of public health, on request for such assistance, district sanitary inspectors may be required to act as inspectors of vaccinations within their sanitary districts, without undue interference with their other duties.

The movements of vaccinators within a sanitary district will be directed by the district medical inspector, after consultation with the supervising vaccinator.

Ordinarily the vaccination work in a district will be prosecuted systematically—house by house, block by block, and street by street. In this way less time will be lost in going from house to house, the general whereabouts of the vaccinators will be known at all times, and their work can be more satisfactorily supervised. Where practicable, two vaccinators should ordinarily work together.

When a case of smallpox occurs, a sufficient number of vaccinators will be immediately withdrawn from other work and sent to vaccinate all the other occupants of the house in which such case occurred and the other persons who have presumably been exposed to the infection. Every effort will be made to seek out and vaccinate these latter persons as soon as possible, and recent successful vaccination will not be a bar to their revaccination.

Persons under instruction.—Persons of good character and ability, desirous of securing instruction in vaccination work for the purpose of fitting themselves for appointment to such positions as vaccinators as may occur in Manila or the provinces, and who are willing to serve without pay, may be assigned as assistant vaccinators to sanitary districts by the supervising vaccinator. While so serving they will be under the immediate direction of the vaccinator in charge, who will be responsible for their good conduct and proper instruction. Such persons, under the immediate supervision of the vaccinator in charge, may perform vaccinations and assist in the preparation of records. Vaccinations done by such persons should be credited on the records to the vaccinator in charge of their instruction.

The supervising vaccinator will keep a list of persons who have been properly trained, as above, during a period of not less than fifteen days and whose character and habits render them suitable persons for appointment as vaccinators. On request from this office he will furnish the names and addresses of those recommended by him for such appointment. As far as practicable, appointments will be made as vaccinators only from persons trained and recommended as above.

Hours of duty.—The hours of duty for vaccinators and inspectors of vaccinations are from 8 to 12 in the morning and from 2 to 5 in the afternoon, and will be rigorously adhered to. Persons under instruction in vaccination work will observe the same hours as vaccinators.

Sanitary inspectors detailed as inspectors of vaccination will observe such hours in respect to vaccination work as the district medical inspector, after conference with the supervising vaccinator, may direct.

Amount of work required.—An efficient vaccinator should average not less than forty vaccinations per day, exclusive of Sundays and legal holidays.

Careful record of the number of vaccinations performed by each vaccinator will be kept by the supervising vaccinator, and report will be made by him in respect to any vaccinator who fails to attain the above daily average in any calendar month. In case explanation satisfactory to this office is not made by the vaccinator concerned, he will be discharged for inefficiency.

In case a vaccinator aggregates fifty vaccinations or over daily, for a period of two months or over, the supervising vaccinator will call attention to his superior efficiency in a letter to the commissioner of public health.

Courtesy by employees.—All vaccinators and inspectors of vaccinations will bear in mind the delicate nature of their duties, and will treat the persons to be vaccinated or inspected with proper courtesy and consideration. Children will be treated with especial gentleness.

Enforcement of vaccination.—Vaccinators are prohibited from using force in accomplishing vaccination. If vaccination is still refused after the provisions and penalties of the act of the Commission and the city ordinance making vaccination compulsory have been explained to the person so refusing, a written report of such refusal will be rendered by the vaccinator to the district medical inspector, who will investigate the case. If vaccination is required and is still refused, the district medical inspector will forward a written report to this office, stating the facts and giving the names and addresses of witnesses, so that the matter may be taken to the courts.

Uniform and appearance.—All employees of the vaccination service will wear the prescribed uniform while on duty. They will pay special attention to the neatness of person and clothing. Bearing in mind the medical nature of their work, they will at all times give great care to the cleanliness of the hands and finger nails and to the avoidance of infection of the vaccination wounds.

Performance of vaccination.—Vaccination will be performed in the following manner:

1. A site at the outer part of the left arm, at the junction of the middle and upper thirds, will usually be selected for vaccination.

2. The skin of the region in which vaccination is to be performed will be thoroughly washed with a pledget of cotton wet in a 5 per cent carbolic-acid solution.

3. The carbolic-acid solution will be removed, and the skin of the site at which vaccination is to be performed will be cleaned by thoroughly wiping with a piece of cotton wet with alcohol. If the carbolic-acid solution is not removed before the performance of vaccination, it is likely to render the virus inert and interfere with the success of the operation.

4. After the alcohol has evaporated and the skin of the site is dry, the latter is put on the stretch by the left hand of the vaccinator.

5. The lancet of the vaccinator will be sterilized by passing it through the flame of the alcohol lamp.

6. A small quantity of vaccine virus is placed on the skin at the site of the proposed vaccination, taking up the virus with the point of the lancet.

7. An abrasion will be made in the skin at the site of the proposed vaccination about one-half of an inch long and one-third of an inch wide, working the vaccine virus well in during the operation. The abrasion will be made by a number of scratches, but care must

be taken that very little blood is drawn. The proper abrasion is one in which the exudate is a little bloody serum only.

8. The abrasion is allowed to dry for two or three minutes.

9. Three or four turns of a sterilized bandage are placed around the arm over the wound and fastened with a pin. This bandage must be sufficiently tight so as not to slip, but not so tight as to cause annoyance.

10. The person vaccinated must be warned not to remove the bandage for at least twenty-four hours. If it slips, it must be replaced or the abrasion covered with a piece of clean cloth. The abrasion should not be wet for two days, after which nothing but clean water should be used thereon. The application at any time of poultices, or any material whatsoever except clean boiled water or clean wet cloths, should be strongly warned against. If the vaccination takes and the arm becomes sore, it should be dressed only with clean cloths wet with clean boiled water and changed twice a day.

11. The person vaccinated will be informed that the vaccination will be inspected in about a week to determine whether it has been successful or not.

Persons to be vaccinated.—Until June 30, 1904, vaccinators will make special effort to search out and vaccinate such persons as were not vaccinated during the calendar year 1903.

The birth records of the districts will be examined from time to time, at least once every three months, and the infants whose births are reported thereon will be sought out and vaccinated in accordance with the provisions of Act 309.

After finishing the work of vaccination of unvaccinated persons, or those not recently vaccinated, the revaccination of the general population of the city will be resumed.

Persons visiting the city as transients will be vaccinated unless presenting evidence of successful vaccination.

Certificates of vaccination by physicians.—The card certificates of the United States Public Health and Marine-Hospital Service, a coordinate branch of the Government, showing that the holder has been successfully vaccinated, will be respected by vaccinators, and the same applies to the certificates of successful vaccination signed by licensed medical practitioners. Such certificates will not be taken up, nor will the holder be ordinarily subjected to vaccination within two years after the date of their issue. Record must be made, however, of all the facts in the case required to be entered on the district vaccination records, and the entry will be made therein that vaccination of the person named was not made because of the certification of successful vaccination by a surgeon of the United States Public Health and Marine-Hospital Service or by a licensed medical practitioner. In such cases the red card (performance of vaccination) will be filled out and filed in the card index of the sanitary station. Certificates that vaccination has been performed, but not certifying to the success of the operation, issued by the above persons, will not be taken up, but under such circumstances the holders of the same will be treated as if vaccination in their case had not been performed.

Vaccine virus.—Vaccine virus will be obtained as required for vaccinators by the supervising vaccinator from the vaccination division of the office of the board of health. Ordinarily not more than a three days' supply will be issued at any one time, to prevent possible deterioration of the virus before use.

Vaccinators are warned that vaccine virus may be rendered inert by exposure for an hour or so to direct sunlight. It will be kept out of sunlight and in as cool a place as possible when not required.

If vaccination is properly performed, only a small amount of vaccine virus is required to produce successful results. Vaccine virus is expensive, and due economy must be exercised in its use.

Should any employee of the vaccination service have reason to believe that the vaccine virus being used is inert or not of good quality he will at once report the fact to the supervising vaccinator.

Vaccinators' supplies.—All supplies required in the work of vaccination, such as carbolic acid, alcohol, cotton, bandages, lamps, and lancets, will be secured from the vaccinating division of the office of the board of health by the supervising vaccinator, a sufficient time in advance. Ordinarily a supply in excess of the needs of two weeks will not be issued. Due economy in the use of supplies is required.

Office and clerical work.—Vaccinators assigned to duty in a sanitary district will be furnished proper desk accommodations and writing facilities in the sanitary stations of such districts, and inspectors of vaccinations, or persons detailed as such, will be given suitable facilities to enable them to properly perform their required clerical work.

All records pertaining to vaccinations performed in a sanitary district are part of the official records of the sanitary station of that district, and the chief sanitary inspector of that district will be responsible for their proper care and preservation. All clerical work connected with the maintenance of district vaccination records will be performed by the vaccinators, inspectors of vaccinations, or persons detailed as such.

The consolidated report of vaccinations, to be rendered daily from each sanitary station

to the supervising vaccinator, will be prepared by the vaccinator placed in charge of the vaccinators of the district.

The consolidated report of the inspections of vaccinatons, to be rendered daily to the supervising vaccinator, will be prepared by the persons performing such work of inspection.

Station vaccination records.—The station vaccination records will be kept on loose blank-form sheets, which will be fastened in a suitable binder to form permanent records. These form sheets will be folded in the center to form double pages, and these pages will be numbered consecutively as entered upon. As many loose form sheets will be numbered, filled in, stitched together, and placed in the binder from time to time, as may be required during the progress of the vaccination work. No sheets will be stitched together on which data required from both vaccinators and inspectors of vaccinations have not been entered.

The blank form sheets will show column spaces on each double page for the desired information, the entry for each person being continued on the same line across both pages. The following information will be entered on the blank form sheets:

Column 1: The consecutive number assigned to the persons vaccinated.
Column 2: The names of the persons vaccinated.
Column 3: The addresses, street and number, of the persons vaccinated.
Column 4: The date of performance of vaccination.
Column 5: Evidence or not of previous successful vaccination.
Column 6: The age of the person vaccinated, whether adult or child.
Column 7. The sex of the person vaccinated.
Column 8: The date of inspection of the vaccination.
Column 9. The result of the recent vaccination, as to whether successful or not.
Column 10: Remarks. In this column will be noted any complications of the vaccinations, remarks as to the apparent quality of the vaccine virus, the efficiency of the vaccinator, etc. If the person vaccinated can not subsequently be found for inspection an entry will be made in the column giving such fact as the reason why inspection of the vaccination was not made.

The signature of the person or persons performing the vaccinations will be entered on each form sheet in the space left therefor, under columns 1 to 9, inclusive. Where two or more vaccinators sign the same sheet each will place his initials in the number space opposite the name of the persons vaccinated by him, so that his work may be properly credited.

The inspector of vaccination, or person acting as such, will sign each form sheet in the space left for such signature under columns 8, 9, and 10.

Certificate of performance of vaccination.—After accomplishing vaccination, vaccinators will immediately sign and issue to the person vaccinated a red card of the prescribed form. This card will show the sanitary station from which issued and a number corresponding to the entry in the vaccination record of such sanitary station pertaining to the person so vaccinated. It will also give the name and address, sex and age, of the person so vaccinated and will give the date on which vaccination was performed.

This card will be retained by the person vaccinated until after examination by an inspector of vaccination, by whom it will be taken up and a white or blue card, as required, issued in lieu thereof. The red card will later be compared at the district station with the corresponding entry in the district vaccination record, after which the card will be filed in the station for possible future reference by name. Filing will be done in alphabetical sequence on the basis of the family name. By referring to the name card and ascertaining the record number therefrom, the data in respect to any person vaccinated and inspected can thus readily be looked up subsequently in the district vaccination record.

Consolidated reports of vaccination.—A consolidated report of vaccinations performed in each sanitary district will be compiled from the vaccination records and forwarded daily by the vaccinator in charge to the supervising vaccinator. This report is required so that the latter may make arrangements for the inspection, at the proper time, of the vaccinations so performed. This report will be made upon a prescribed blank form, and will contain the following information:

1. Total number of persons vaccinated in the district.
2. Number of persons vaccinated showing evidence of previous successful vaccination.
3. Number of persons vaccinated not showing evidence of previous successful vaccination.
4. Total number of adults vaccinated.
5. Total number of children vaccinated.
6. Total number of males vaccinated.
7. Total number of females vaccinated.
8. Total number of persons vaccinated by each vaccinator, giving the name of the latter.

The above report will be forwarded daily, covering the previous twenty-four hours ending at 5 o'clock in the afternoon, except in the case of Sundays and legal holidays. The supervising vaccinator will keep accurate note of these daily reports, and if they are not received within twenty-four hours after becoming due they will be called for by him.

The above daily vaccination reports from the several sanitary districts will be consolidated

for the city by the supervising vaccinator on each Monday for the previous calendar week and forwarded to the commissioner of public health.

The daily vaccination reports from the several sanitary districts will also be consolidated for the city for each calendar month by the supervising vaccinator, and forwarded to the commissioner of public health on or before the 5th of the following month.

All these consolidated vaccination reports will be rendered on the same blank forms.

Records of inspection of vaccinations.—All vaccinations performed will be inspected by a vaccination inspector, or a sanitary inspector acting as such, between the sixth and tenth days after the performance of vaccination. Record will be made as to the results attained on the prescribed forms. For this purpose the necessary sheet forms showing the vaccinations performed may be temporarily removed from the vaccination records of the district sanitary station by authorized inspectors, for the purpose of securing the names and addresses of the persons to be inspected. A memorandum receipt for the loose form sheets so removed will be left by the inspector and taken up by him on return of the same.

Particular care will be observed in the differentiation between true vaccina and inflamations due to infection with pyogenic germs and in making proper reports thereon. In the column for "remarks" on the blank vaccination record form brief entry will be made of the occurrence of any such infections, so that proper adherence by vaccinators to measures of cleanliness and antisepsis may be determined from the records.

In case of serious illness or death following vaccination, and apparently in any way related thereto, the inspector of vaccinations cognizant thereof will immediately report the fact in writing to the district medical inspector, who, with the supervising vaccinator, will make a careful investigation of the matter and forward a full written report thereon to the commissioner of public health.

Certificate of unsuccessful vaccination.—If, on examination by an inspector of vaccinations, the vaccination performed is found to have been unsuccessful, the inspector will issue a white card, signed by him, stating this fact and showing the sanitary station from which issued, the entry number of the station vaccination record, the name, address, sex, and age of the person vaccinated, and the date on which the unsuccessful vaccination was performed.

This card will be retained by the person to whom issued, but it is not to be construed as authority for refusal by the holder to submit to revaccination should such be subsequently required.

Certificate of successful vaccination.—Where the inspector of vaccinations finds that a vaccination has been successful he will issue a blue card stating this fact and showing the sanitary station from which issued, the entry number of the station vaccination record, the name, address, sex, and age of the person vaccinated, the date on which the vaccination was performed, and the signature of the inspector of vaccinations.

This card will be retained by the person vaccinated and will be accepted as exempting such person from further vaccination for the period of two years from the date of the successful vaccination, provided the holder is not found to have been in contact with smallpox during this period.

Report of inspection of vaccinations.—A consolidated report of inspections of vaccinations performed in each sanitary district will be compiled from the vaccination records and forwarded daily by the persons making such inspections to the supervising vaccinator, the latter making out a similar summary in respect to inspections of vaccinations made by him. This report is required so that the supervising vaccinator may make the consolidated reports required regarding inspection of vaccinations. This report will be made on a prescribed blank form and will contain the following information:

1. Total number of persons inspected as to success of vaccination.
2. Total vaccinations found to be successful.
3. Total vaccinations found to be unsuccessful.
4. Number of persons inspected who have been previously successfully vaccinated.
5. Total vaccinations successful in persons previously successfully vaccinated.
6. Total vaccinations unsuccessful in persons previously successfully vaccinated.
7. Total adults successfully vaccinated.
8. Total children successfully vaccinated.

The above report will be forwarded daily, covering the previous twenty-four hours ending at 5 o'clock p. m., except in the case of Sundays and legal holidays. The supervising vaccinator will keep accurate note of these daily reports, and if any are not received within twenty-four hours after becoming due they will be called for by him.

The above daily reports of inspections of vaccinations from the several sanitary districts will be consolidated for the city by the supervising vaccinator on each Monday for the previous calendar week and forwarded to the commissioner of public health.

These daily reports from the several sanitary districts will also be consolidated for the city for each calendar month by the supervising vaccinator and forwarded to the commissioner of public health on or before the fifth of the following month.

All these consolidated vaccination reports will be rendered on the same blank forms.

PROVINCIAL VACCINATIONS.

During the year there have been 1,430,735 units of vaccine virus sent to the provinces.

This office is not yet in possession of accurate data as to the exact number of vaccinations that have been made in the provinces, though it will not fall short of the number of units of vaccine virus distributed.

The greatest difficulty encountered in the provincial vaccinations is the lack of transportation facilities, which seriously impairs the efficiency of the service, especially with respect to the movement of vaccinators and the transportation of vaccine virus, which is sometimes delayed so long that it is worthless when it reaches its destination. To overcome this difficulty the board of health has made special ice boxes for the shipment of vaccine virus.

Formerly the natives were prejudiced against vaccination, and there were instances where it was thought best to temporarily discontinue the work rather than excite their active opposition; however, since the plan of sending out intelligent, neatly-uniformed men from Manila, and the introduction of the systematic methods devised by Captain Munson, this opposition is rapidly disappearing. The circular prepared by Captain Munson, clearly defining the relations of the insular vaccinators to the provincial and municipal authorities, is as follows:

CIRCULAR OF INSTRUCTIONS FOR THE CONDUCT OF THE PROVINCIAL VACCINATION SERVICE IN THE PHILIPPINE ISLANDS.

1. The following is published for the information and guidance of all concerned, and will hereafter govern the work of vaccination and the maintenance of records and rendering of reports thereon throughout the Philippine Islands, except the city of Manila, in which such work will be performed in accordance with the provisions of Circular C-18, dated March 1, 1904:

Chief of vaccination service.—A chief of the vaccination service for the Philippine Islands, detailed from the physicians under the board of health, will be in charge of and responsible for the general service of vaccination, and the preventive inoculation of human beings, and for the sale, distribution, and supply of vaccine virus and prophylactic serums in the city of Manila and throughout the Philippine Islands, under the provisions of law under the direction of the commissioner of public health. For this purpose he will be furnished office accommodations for himself and assistants in connection with the offices of the board of health.

2. *Chief supervising vaccinator for the Philippine Islands.*—A chief supervising vaccinator for the Philippine Islands will be responsible for the instruction and efficiency of all inspectors of vaccination and of vaccinators, and for the proper preparation and maintenance of all records and statistics relating to vaccination in the city of Manila and in the provinces, under the chief of the vaccination service for the Philippine Islands. He will make recommendations as to assignments to duty of the inspectors of vaccination, and of vaccinators, keeping a roster for that purpose, and will personally make such inspections to direct and determine the efficiency of his subordinates, in Manila and in the provinces, as may be required by the commissioner of public health. He will have the necessary clerical assistance for maintaining the records and compiling the statistics of his office.

3. *Vaccine supply officer.*—A chief sanitary inspector or clerk detailed in the office of the chief of the vaccination service for the Philippine Islands will, in addition to his other duties, have direct charge, under the chief of the vaccination service, of the procuring, shipping, and sale of vaccine virus and prophylactic serums, the issue of vaccinators' supplies, and the preparation and maintenance of all papers, invoices, bills, receipts, and records relating thereto.

4. *Assignments to duty of employees of vaccination service.*—Inspectors of vaccination and vaccinators will do service in any place in the provinces as required. It is expected that all provincial employees will perform their fair share of work in the more remote

localities, and a roster will be maintained under which employees who have served a reasonable period in such localities will be transferred to more desirable stations as opportunity offers.

This office will not authorize the issue of return transportation to Manila of employees of the vaccination service who have not served a reasonable time in the provinces, unless there are unusual and valid reasons for such return at the public expense.

5. *Relations of employees to presidents of provincial boards of health.*—The president of a provincial board of health will have control of the provincial inspectors of vaccination and vaccinators assigned to his province, and will detail them to duty from time to time at such stations as may be necessary, subject to the exception stated in the following section. While serving in his province, the president of a provincial board of health will be held responsible to this office for the efficiency, industry, good conduct, maintenance of proper records, and the prompt forwarding of required reports by provincial inspectors of vaccinations and vaccinators.

6. *Vaccinators ordinarily assigned to duty in towns without sanitary organization.*—Vaccinators will ordinarily be assigned by presidents of provincial boards of health to duty in municipalities having no medical men as heads of the local boards of health; provided, that for municipalities having a president of the municipal board of health who is a physician, but in which the population is so great as to make it obvious that the work of vaccination can not be properly carried out by that official without assistance, a suitable number of vaccinators may be detailed by the president of the provincial board of health, under special authority secured from the commissioner of public health in each case, to render the necessary assistance to the president of the municipal board of health in question.

7. *Relations of employees to presidents of municipal boards of health.*—When vaccinators are assigned to duty to assist a physician who is a president of a municipal board of health, they will be ordered to report to him and work under his immediate direction and control, and under such circumstances the president of the municipal board of health will be held directly responsible by the president of the provincial board of health for their good conduct and the proper performance of duty by them.

8. *Vaccinators in charge.*—Two or more vaccinators will ordinarily be assigned to work together in the same municipality. When several vaccinators are working together in a municipality in which there is no president of municipal board of health who is a physician, one vaccinator will be placed in charge of the others by the president of the provincial board of health and will be responsible to the latter for the efficiency, attention to duty and good conduct of those subordinate to him.

9. *Pay and allowance.*—The pay and allowance of inspectors of vaccination and of vaccinators sent from Manila will be ₱60 per month, with no additional allowance under any circumstances for subsistence. Reimbursement for the actual expense of transportation, incurred under orders issued by the commissioner of public health or by presidents of provincial boards of health, will be made: provided that the travel vouchers are made out in duplicate, are properly sworn to as correct by the employee of the vaccination service, are countersigned by the president of the provincial board of health, and are accompanied by duplicate copies of the orders under which the travel was performed and by duplicate receipts for the money expended for transportation.

10. The pay and allowances of vaccinators, appointed in the provinces and not sent from Manila, will be ₱30 per month, with an additional allowance for subsistence of not to exceed ₱1 per day for a period of not more than twenty consecutive days in any one municipality: the auditor having decided that a period greater than twenty consecutive days in any one municipality is not to be regarded as temporary duty. All expense vouchers for subsistence must be made out by each provincial vaccinator in duplicate, properly sworn to as correct by the vaccinator, countersigned by the president of the provincial board of health, and must be accompanied by duplicate copies of the orders under which the duty was performed, and by duplicate receipts for the money expended for subsistence. Travel vouchers are made out and rendered by vaccinators appointed in the provinces in the same way as above described for inspectors of vaccinations and vaccinators sent from Manila, except that vaccinators appointed in the provinces are allowed reimbursement for subsistence not to exceed ₱1 per day when traveling as well as when engaged in the work of vaccination. The acceptance by any employee of any personal fees for work performed for any person is unlawful. Fees can only be charged and collected under the provisions of Act No. 309.

11. All accounts for pay, travel and subsistence must be forwarded by employees to the president of the provincial board of health of the province in which they are serving, who will carefully examine them and see that they are made out in the required manner before countersigning and forwarding them to the disbursing officer, board of health, Manila, for payment. If not properly made out, the voucher must be immediately returned by the president of the provincial board of health to the employee of the vaccination service rendering the same, so that they may be corrected without great delay and hardship to such

employee, which results when improperly made out vouchers are sent to this office and have to be returned from Manila to the employee for correction. The attention of the presidents of provincial boards of health is particularly invited to the great importance of this matter.

12. All vouchers for pay must be rendered on auditor's form blank No. 132; vouchers for traveling expenses and subsistence must be rendered on auditor's form blank No. 115; receipts for money expended are best taken on board of health blank form No. 20 receipt book. Employees of the vaccination service should take care to keep sufficient blank forms of this kind in their possession. Auditor's form blanks Nos. 132 and 115, and board of health form blank No. 20, may be obtained from any president of a provincial board of health or from the disbursing officer, board of health, Manila, P. I.

13. *Personal report.*—A monthly personal report and itinerary, showing the station of each employee of the vaccination service, together with a statement as to whether engaged in work or travel for each day of the month, or lesser period of duty, for which the claim for pay is made, must be sent to the president of the provincial board of health with the pay, subsistence, and travel vouchers, and will be forwarded by that official, with these vouchers, to the disbursing officer, board of health, Manila, P. I.

14. *Hours of duty.*—The hours of duty for vaccinators and inspectors of vaccinations are from 7.30 to 12 in the morning, and from 2 to 5 in the afternoon, daily, except Sundays and legal holidays, and these hours will be rigorously observed.

15. *Amount of work required of employees of the vaccination service.*—It is estimated from the best information available and reports received in this office that allowing for time necessarily lost in travel and in securing attendance for vaccination on the part of the people, one provincial vaccinator should be able to average sixty vaccinations daily. Allowing 300 working days to the year, each such vaccinator should therefore perform 18,000 vaccinations annually. Many vaccinators have in the past accomplished more than this. It is estimated that one inspector of vaccinations on duty in the provinces should ordinarily be able to inspect 200 vaccinations daily, which, allowing 300 working days in a year, amount to a total of 60,000 inspections of vaccinations annually.

16. Record of the amount of work performed by each employee will be kept by the president of the provincial board of health, who will recommend the discharge for inefficiency of any employee who fails to secure the above average for two consecutive months; provided that where an employee fails to secure the above average, and the president of the provincial board of health shall certify that the failure of the employee to secure the required average was due to circumstances over which he had no control and not to his inefficiency, such employee may not be discharged.

17. Unusual efficiency on the part of a vaccinator or inspector of vaccination should be reported to the commissioner of public health by the president of the provincial board of health for his information.

18. *Work required of presidents of municipal boards of health.*—Under section 6 of Act No. 308, presidents of municipal boards of health are required to perform the services of vaccinators, and as such will comply with the provisions of this circular. When the vaccination of all the inhabitants of a town possessing a president of municipal board of health is ordered, this official will be required to vaccinate an average of not less than 400 persons per month, and will be expected, if his other duties permit, to exceed this average and bring the work of vaccination to an end at a correspondingly earlier date. Attention is invited to the fact that one president of a municipal board of health recently vaccinated more than 5,000 persons in sixteen days. Where it falls to the president of a municipal board of health to inspect the vaccinations performed by him, an average of 250 persons vaccinated and inspected by him monthly will be regarded as satisfactory.

19. Any president of a municipal board of health who fails for two consecutive months to accomplish the above required number of vaccinations, after the vaccination of the whole population of his municipality is ordered, will be reported to this office for inefficiency, if due investigation by the president of the provincial board of health shall show that failure to attain the required number of vaccinations was not due to conditions over which the president of the municipal board of health had no control.

20. No vaccinator will ordinarily be assigned to duty in a municipality having a population of less than 5,000 persons, and which has a president of a municipal board of health, provided that cases of smallpox are not occurring in that municipality.

No president of a municipal board of health will be required to perform vaccinations in the absence of an epidemic of smallpox in any municipality other than the one of which he is the health officer.

21. *Preparation of records.*—All persons performing vaccinations and inspecting vaccinations are required to prepare the records and reports required relative to the individuals vaccinated or inspected by them.

22. All blank forms and official envelopes will be supplied by the president of the provincial board of health, who will make requisition for them to the commissioner of public health, and will be held responsible for their proper supply to the employees of the vaccination service.

23. The accommodations set aside for the carrying out of vaccination under section 10 of Act 309 will be used as an office by the employees of the vaccination service, and for this purpose will be temporarily equipped by the municipal secretary with a table, sufficient chairs, pens, and ink.

24. All permanent records and reports must invariable be made out in ink.

25. *Conduct.*—Inefficiency, inattention to duty, or bad conduct, will be a cause for recommendation by the president of a provincial board of health for the dismissal of any employee of the vaccination service on duty in his province, apparently guilty of same. If such recommendation is approved by the commissioner of public health, the employee of the vaccination service so offending, will be discharged.

26. *Uniform and appearance.*—All employees of the vaccination service will wear the prescribed uniform while on duty. They will pay special attention to the neatness of person and clothing. Bearing in mind the medical nature of their work, they will at all times give great care to the cleanliness of the hands and finger nails and the avoidance of infection of the vaccination wounds.

27. *Assistance by local governing officials.*—All employees will bear in mind that their work will be greatly facilitated by the establishment of cordial relations between themselves and the authorities of the municipalities in which they may be called upon to serve. On arriving in a municipality in which there is no president of the municipal board of health who is a physician, all officials of the vaccination service will promptly call upon the municipal president and request him to facilitate their work as much as possible, and to cause the general information to be properly conveyed to the people as to the presence in the municipality of vaccinators or inspectors of vaccinations of the board of health for the Philippine Islands, the place where they may be found, the hours when they are on duty, and the necessity on the part of all persons for being protected against smallpox and for complying with the insular laws regarding vaccination. If such a list be available, the president of the municipality shall give the vaccinators access to a list containing the names of the residents of the municipality, or those holding cedulas, to facilitate the work of general vaccination.

28. Any hindrance by any person to the work of the vaccination service will be promptly reported by the vaccination officials to the president of the municipality. If proper relief and assistance is not offered by him, the facts in the case will be promptly set forth in a report to the president of the provincial board of health by the vaccination official cognizant of the matter, and a duplicate copy of this report will be furnished at the same time to the president of the municipality for his information. The president of the provincial board of health will immediately forward such report on its receipt by him, to the proper provincial authorities for their consideration and action, making suitable recommendation in each case.

29. When vaccinators report for duty in a municipality in which there is a president of the municipal board of health who is a physician, they become his subordinates while serving in that municipality, and it is his duty to make such arrangements with the local authorities as will facilitate the work of the vaccination service.

30. *Systematic vaccination in provinces.*—Ordinarily, a province which is to have its entire population vaccinated will be divided into districts by the president of the provincial board of health, who, in so doing, will consider the number and character of the population to be vaccinated in the proposed district, difficulties of transportation, and the number of employees to be assigned to that district.

31. Within the district, a regular itinerary from town to town should be prescribed and issued in orders to the respective employees of the vaccination service under this itinerary. The work of vaccination and inspection of vaccinations should be prosecuted systematically, municipality by municipality, the employees of the vaccination service relinquishing their respective work in a municipality only when all persons therein have been vaccinated and the vaccinations inspected. Within municipalities, the population should be gone over systematically, street by street. In this way, time and labor can be saved, and there is less liability of persons being overlooked by the employees of the vaccination service.

32. *Vaccination during the existence of smallpox.*—When smallpox appears in a municipality of a province in which vaccinators are working, a sufficient number of the latter will be withdrawn from other stations of duty and sent without delay to the municipality in which smallpox exists, for the purpose of suppressing the disease. Any other occupants of a house in which a case of smallpox has occurred, will first be vaccinated, after which the other persons who have presumably been exposed to the infection will be sought out and vaccinated, and recent successful vaccination will not be a bar to the revaccination of such a person.

33. After such persons as have presumably come in contact with the smallpox infection have been vaccinated, such protection by vaccination of the general population as may appear to be necessary will be carried out in order to prevent the further development of the disease.

34. *Method of performing vaccination.*—Vaccination will be performed in the following manner: (These instructions are the same as given for the city of Manila.)

35. *Persons to be vaccinated.*—When the population of a province is to be generally vaccinated, all persons will be vaccinated who can not show satisfactory evidence of successful vaccination within the previous calendar year.

36. All persons will be vaccinated or revaccinated who have recently been exposed to the infection of smallpox.

37. All persons who are transient residents of a municipality, the population of which is being vaccinated, will be vaccinated unless presenting satisfactory evidence of recent successful vaccination.

38. All presidents of municipal boards of health will examine the birth records of their municipalities during the months of January and July of each year, and the infants whose births are reported thereon as having occurred during the previous six months period will be promptly sought out and vaccinated in accordance with the provisions of Act No. 309.

39. *Enforcement of vaccination.*—Vaccinators are prohibited from using force in accomplishing vaccinations. If vaccination is still refused after the provisions and penalties of Act No. 309 of the Philippine Commission making vaccination compulsory have been explained to the persons so refusing, a written report of such refusal will be rendered by the vaccinator to the municipal president, through the president of the municipal board of health, if there be such a board, requesting that the person so refusing be brought to trial before the courts.

40. *Courtesy by employees.*—All vaccinators and inspectors of vaccinations will bear in mind the delicate nature of their duties, and will treat the persons to be vaccinated or inspected with proper courtesy and consideration. Children will be treated with especial gentleness.

41. *Certificates of vaccination by physicians.*—The card certificates of the United States Public Health and Marine-Hospital Service, showing that the holder has been successfully vaccinated, will be respected by vaccinators, and the same applies to the certificates of successful vaccinations signed by licensed medical practitioners. Such certificates will not be taken up nor will the holder be ordinarily subjected to vaccination within two years after the date of their issue. Record must be made, however, of all the facts in the case required to be entered on the municipal vaccination records, and the entry will be made therein that vaccination of the person named was not made because of the certification of successful vaccination by a surgeon of the United States Public Health and Marine-Hospital Service or by a licensed medical practitioner. In such cases, the red card (performance of vaccination) will be filled out and filed in the card index of the municipal board of health, or in the absence of such a body, with the municipal secretary. Certificates that vaccination has been performed, but not certifying to the success of the operation, issued by the above persons will not be taken up, but under such circumstances the holders of same will be treated as if vaccination in their case had not been performed.

42. *Certificates of performance of vaccination.*—After accomplishing vaccination the vaccinator will immediately sign and issue to the person vaccinated a red card of the prescribed form. This card will show the name of the province and of the municipality from which issued and the number corresponding to the entry in the vaccination record of the municipality pertaining to the person so vaccinated. It will also give the name, sex, and age of the person so vaccinated, the location of the vaccination, and the date on which such vaccination was performed.

43. This card will be retained by the person vaccinated until after examination by an inspector of vaccination, by whom it will be taken up and a white card or blue card, as required, issued in lieu thereof. The red card thus taken up will later be compared with the corresponding entry in the municipal vaccination record, after which the card will be filed with the president of the municipal board of health, if there be one, or with the municipal secretary for possible future reference by name. Filing will be done in alphabetical sequence on the basis of the family name. By referring to the name card, and ascertaining the record number therefrom, the data in respect to any person vaccinated and inspected can thus readily be looked up subsequently in the municipal vaccination record.

44. *Municipal vaccination record.*—The municipal vaccination record will be kept on loose blank form sheets, which will be fastened in a suitable cover of stout paper to form permanent records. These form sheets will be folded in the center to form double pages, and these pages will be numbered consecutively as entered upon. As many loose form sheets will be numbered, filled in, stitched together, and placed in the binder from time to time as may be required during the progress of the vaccination work.

45. The above blank form sheets will show column spaces on each double page for the desired information, the entry for each person being continued on the same line across both pages. The following information will be entered on the blank form sheets:

Column I: The consecutive numbers assigned to the persons vaccinated.

Column II: The names of the persons vaccinated.

Column III: The region of the body on which vaccination was performed.

Column IV: The date of performance of vaccination.

Column V: Evidence or not of previous successful vaccination.
Column VI: The age in years of the person vaccinated.
Column VII: The sex of the person vaccinated.
Column VIII: The date of inspection of the vaccination.
Column IX: The result of the recent vaccination, as to whether successful or not.
Column X: In this column will be noted any complications of the vaccination, remarks as to the apparent quality of the vaccine virus, etc. If the person vaccinated can not subsequently be found for inspection, an entry will be made in this column giving such fact as the reason why inspection of the vaccination was not made.

46. Columns I to VII, inclusive, will be filled out by the vaccinator at the time the vaccination is made, and his signature will also appear at the bottom of each sheet. Where two or more vaccinators sign the same sheet, each will place his initials in the number space opposite the names of the persons vaccinated by him, so that his work may be properly credited. When the municipal vaccination form sheets have been filled up, they will be at once turned over by the vaccinators to the secretary of the municipality, who will preserve them as public documents.

47. Where vaccinations are performed by the local president of the municipal board of health, the same records as are required to be kept by provincial vaccinators will be prepared and signed by him and will be filed in the possession of the municipal secretary as a public document.

48. The inspector of vaccinations, or president of municipal board of health, acting as such, will enter the information required to be entered in Columns VIII, IX, and X, and will sign the form sheet below these columns.

49. *Municipal consolidated reports of vaccinations performed.*—On concluding their work in a municipality, or upon being ordered from it to another station, a summary report of the work performed by them in such municipality will be immediately forwarded by the vaccinators to the president of the provincial board of health under whom they are serving, through the president of the local municipality, who will enter thereon a statement as to whether he believes the report to be correct and whether the conduct and efficiency of the vaccinators while in his municipality have been satisfactory. This report will be numerical only and will state:

Column I: Total population of the municipality.
Coumn II: Total number of persons vaccinated in the municipality.
Column III: Number of persons vaccinated showing evidence of previous successful vaccination.
Column IV: Number of persons vaccinated not showing evidence of previous successful vaccination.
Column V: Total number of adults vaccinated.
Column VI: Total number of children vaccinated.
Column VII: Total number of males vaccinated.
Column VIII: Total number of females vaccinated.
Column IX: Total number of persons vaccinated by each vaccinator, giving the name of the latter.

This report will also state the future itineraries of the vaccinator, so far as known.

50. Where vaccinations are performed by the local president of the municipal board of health, a consolidated report giving the information above specified will be prepared and forwarded by him for each calendar month, within five days after the end of such month, to the president of the provincial board of health.

51. As far as practicable, an inspector of vaccination will arrive in a town in which vaccinators have been or are operating about one week after commencement of work by the latter. On arrival, after reporting to the president of the municipality, he will secure from the municipal secretary, giving his receipt therefor, such municipal vaccination record sheets as have been filed with that official by the vaccinators or by the president of the municipal board of health, and will personally examine each person whose name appears thereon to determine whether the vaccination entered therein as having been performed has been successful or not, giving particular care to the differentiation between true vaccinia and inflammation due to pyogenic germs, and to making proper report thereon. He will note in the proper columns on the vaccination record sheets the date on which such inspection was made and the result of the vaccination. If he is unable to verify the result of vaccination in the case of any person whose name appears on the municipal vaccination record, he will enter in the column for remarks, opposite the name of the individual in question, the reason why he was unable to make such inspection—as, from sickness, death, or absence of the person to be inspected. He will also enter in the column for remarks any facts of interest relating to the character of the vaccine virus used or the proper and cleanly performance of vaccination by the vaccinators. On completion of the inspection of the persons vaccinated the inspector of vaccination will sign the municipal vaccination record sheets and return the same promptly to the municipal secretary for file as a public document.

52. In case an inspector of vaccination is not sent to a municipality in which the president of the municipal board of health is required to perform the vaccination of the population, the latter will make the necessary inspection to determine the efficiency of the vaccinations performed by him, will make the required entries regarding such inspection in the municipal vaccination record, and will prepare and forward to the president of the provincial board of health the summary report of inspection of vaccinations as required of inspectors of vaccinations and hereafter described.

53. *Certificate of unsuccessful vaccination.*—If, on examination by an inspector of vaccinations, the vaccination performed is found to have been unsuccessful, the inspector will at once issue to the person vaccinated a white card, signed by him, stating this fact and showing the province and municipality from which issued, the entry number in the municipal vaccination record, the name, sex, and age of the person vaccinated, the location of the vaccination, the date on which the unsuccessful vaccination was performed, and the signature of the inspector of vaccination.

This card will be retained by the person to whom issued, but it is not to be construed as authority for refusal by the holder to submit to revaccination should such be subsequently required.

Certificate of successful vaccination.—Where the inspector of vaccinations finds that a vaccination has been successful he will at once issue to the person vaccinated a blue card, stating this fact and showing the province and municipality from which issued, the entry number of the municipal vaccination record, the name, sex, and age of the person vaccinated, the location of the vaccination, the date on which the vaccination was performed, and the signature of the inspector of vaccinations.

This card will be retained by the person vaccinated and will be accepted as exempting such person from further vaccination for the period of two years from the date of the successful vaccination, provided the holder is not found to have been in contact with smallpox during this period.

55. *Summary report of inspection of vaccinations.*—On concluding his work in a municipality, the inspector of vaccinations will compile from the vaccination records of the municipality and promptly forward to the president of the provincial board of health a numerical summary on the prescribed form of the work done by him in such municipality, giving the following information:

Column I: The total number of persons vaccinated, as shown by the municipal vaccination records.

Column II: Total number of vaccinated persons inspected as to success of vaccination.

Column III: Total vaccinations found to be successful.

Column IV: Total vaccinations found to be unsuccessful.

Column V: Number of persons inspected who have been previously successfully vaccinated.

Column VI: Total vaccinations successful in persons previously successfully vaccinated.

Column VII: Total vaccinations unsuccessful in persons previously successfully vaccinated.

Column VIII: Total adults successfully vaccinated.

Column IX: Total children successfully vaccinated.

56. The above report will be forwarded by the inspector of vaccinations through the municipal president, who, in transmitting it to the president of the provincial board of health, will indorse upon the back of the report a statement as to whether he believes the report to be correct and whether the conduct and efficiency of the inspector of vaccinations while in his municipality have been satisfactory.

57. *Special reports by inspectors of vaccinations.*—When an inspector of vaccinations or other official engaged in the work of vaccination discovers that the results of vaccination are unsuccessful, due to improper methods on the part of the vaccinators or to deterioration of the vaccine virus, he will at once notify the president of the provincial board of health by the most rapid means of communication, so that the latter may take the necessary steps to stop the work of the vaccinators until fresh virus has been issued them or the methods of the vaccinators have been corrected.

58. In case of serious illness or death following vaccination, or apparently in any way related thereto, the inspectors of vaccinations cognizant will immediately enter the facts briefly in the column for remarks on the municipal vaccination record, opposite the name of the person vaccinated, and will make a full special report of the fact in writing to the president of the provincial board of health. The latter will make such further investigation of the matter as may be practicable and will forward all papers, with a statement as to the results of any further investigation made by him, to the commissioner of public health.

Certification of municipal vaccination records by the municipal president.—Before the completed municipal record of vaccinations performed and inspected is finally filed by a municipal secretary, it will be signed on the outside sheet by the municipal president, who will also indorse thereon whether he believes the within record to be accurate and whether the

conduct and services in his municipality of the official of the vaccination service whose signature appears within have been satisfactory.

In case such services have not been satisfactory, or the records are not believed to be accurate, the municipal president will at once report the facts in the case to the president of the provincial board of health, who will promptly cause an investigation to be made and take the necessary action in the case.

60. *Reports by municipal secretaries.*—When the work of general vaccination is undertaken in a province, the president of the municipal board of health will request the governor of the province to direct all municipal presidents to cause the municipal secretaries of their respective municipalities, within thirty days after the inspector or inspectors of vaccinations, or the president of the municipal board of health acting as such, shall have finished their work in their municipalities, to compile from the vaccination records and forward in writing to the president of the provincial board of health a numerical statement based thereon and giving:

1. The total population of the municipality.
2. The total number of persons vaccinated in the municipality during the previous year or the period covered by the vaccination records.
3. The number so vaccinated, but in whom the records show that the operation has not proven, for any reason, to be successful.

61. *Revaccination.*—When the number of unvaccinated persons or those unprotected against smallpox by failure of vaccination reported from any municipality by the municipal secretary is sufficiently large to warrant such action by the president of the provincial board of health, he will cause the necessary number of vaccinators and inspectors of vaccination to revisit such municipality for the purpose of properly completing the work of the vaccination service in that municipality at as early a date as practicable without interfering with the vaccination service in other municipalities of his province. Where officials of the vaccination service revisit a municipality for the purpose of completing work of the vaccination service they will be guided by the same rules as have already been laid down.

62. *Consolidated reports by presidents of provincial boards of health of vaccinations performed and inspected in their province.*—All reports of vaccinations performed during each month within the various municipalities of the province, and all reports of the inspection of such vaccinations received by the president of the provincial board of health will be consolidated by him into a summary report for the province, and a copy of this report will be mailed to the commissioner of public health within five days after the municipal reports upon which it is based have been received. A duplicate copy of this report must be filed in the office of the president of the provincial board of health as part of its records, together with the original municipal reports upon which it is based. In order to insure promptness in the rendering of his consolidated provincial report, each president of a provincial board of health will call upon all vaccinators, inspectors of vaccinations, and presidents of municipal boards of health, whose reports have not been received by him within a reasonable time, to furnish the same without delay.

63. This consolidated report of the president of a provincial board of health will be rendered on a prescribed blank form and will contain the following information:

Column I: Names of municipalities of provinces in which vaccination work was performed.

Column II: Names of vaccinators or presidents of municipal boards of health performing vaccinations in such municipalities.

Column III: Names of inspectors of vaccinations or presidents of municipal boards of health making inspections of vaccinations in such municipalities.

Column IV: Date when vaccinations were completed.

Column V: Date when inspections of vaccinations were completed.

Column VI: Total number of persons vaccinated.

Column VII: Total number of persons vaccinated showing evidence of previous successful vaccination.

Column VIII: Total number of persons vaccinated not showing evidence of previous successful vaccination.

Column IX: Total number of adults vaccinated.

Column X: Total number of children under 14 years of age vaccinated.

Column XI: Total number of males vaccinated.

Column XII: Total number of females vaccinated.

Column XIII. Total number of persons inspected as to success of vaccination.

Column XIV. Total vaccinations successful.

Column XV. Total vaccinations unsuccessful.

Column XVI. Total numbers of persons inspected who had previously been successfully vaccinated.

Column XVII. Total vaccinations successful in persons previously successfully vaccinated.

Column XVIII. Total vaccinations unsuccessful in persons previously successfully vaccinated.

Column XIX. Total adults successfully vaccinated.

Column XX. Total children successfully vaccinated.

Column XXI. Quality of virus used.

Column XXII. Conduct of official of vaccination service named.

Column XXIII. Average daily number of vaccinations and inspections of vaccinations performed by each vaccinator and inspector.

64. Copies of all orders issued during the month by the president of the provincial board of health for the movement of vaccinators and inspectors of vaccination, together with a statement of the proposed stations for duty of these employees during the ensuing month, will be forwarded by him with the consolidated provincial report to the commissioner of public health, so that the latter may at all times be informed as to the whereabouts of such employees.

65. *Vaccinators' supplies.*—All supplies required in the work of vaccination, such as vaccine virus, carbolic acid, alcohol, cotton, bandages, lamps, and lancets, will be provided by the supply officer of the vaccination division of the board of health. Vaccinators proceeding from Manila will provide themselves with supplies before departure for duty in the provinces. Additional supplies for the provinces will be obtained from the president of the provincial board of health, who will make requisition to the commissioner of public health in advance for the articles and quantities likely to be required, keeping in mind the liability of delay in their transportation, so that the work of vaccination may not have to be suspended for lack of supplies. In making requisition, either by letter or telegram, presidents of provincial boards of health must in every case state the quantity required of each article asked for by them. A supply in excess of the probable needs of one month will not ordinarily be asked for. Due economy in the use of supplies will be required.

66. *Care of vaccine virus.*—All persons performing vaccinations are warned that vaccine virus may be rendered inert and worthless by exposure for an hour or so to direct sunlight, by exposure for a day or so to diffuse light, as in a house, and in a week or ten days under ordinary conditions of temperature. It should, therefore, be carefully kept away from the light and in a cool place when not required. Where it can not be kept on ice, not more than a week's supply should be sent out at any one time, so that the virus in the possession of the vaccinator may always be reasonably fresh.

67. Should any person performing vaccination have reason to believe that the vaccine virus in his possession is inert, he will at once suspend work and request a fresh supply of virus from the president of the provincial board of health by the quickest means of communication. Work done with spoiled virus is not only wasted, but it affords an excuse on the part of the people to object to revaccination.

68. *Supply of vaccine virus.*—Requisitions for the vaccine virus necessary for the performance of vaccination in their provinces will be made by telegraph by presidents of provincial boards of health to the commissioner of public health. Such requisition will be made in advance, bearing in mind the difficulties of transportation, so that the work of vaccination may not be suspended for lack of vaccine virus.

69. Vaccinators and presidents of municipal boards of health will from time to time, in advance, inform the president of the provincial board of health of the province in which they are of the amount of vaccine virus which will be needed on a date fixed by them for the continuation without interruption of the work of vaccination by them.

70. Where the time required for communication is so short that vaccine virus may be sent without great liability of deterioration, it may be sent by mail, messenger, or other convenient method, without special measures for its preservation. When shipped under such conditions it must be used without delay on receipt to prevent spoiling.

71. In provinces in which general systematic vaccination is to be carried on among the population, and which are not readily accessible from Manila within forty-eight hours by frequent facilities for communication, the commissioner of public health may establish substations for the supply of vaccine virus in the capitals of such provinces, to be under the immediate charge of presidents of the provincial boards of health. These substations will be provided with refrigerators, and supplies of ice will be sent from Manila if it can not be purchased locally. All vaccine virus received by presidents of provincial boards of health in charge of such supply stations will be placed in the refrigerator on ice until distributed for use in the performance of vaccination. The refrigerators will be habitually kept locked, and the ice issued or purchased for the preservation of the vaccine virus must not be used for any other purpose.

72. When ice can be purchased locally, not more than 50 pounds daily will be authorized for the preservation of vaccine virus at a vacine virus supply substation; where the necessary ice must be sent from Manilla, and is thus liable to loss from melting en route, not more than 100 pounds daily will be supplied. Bills and vouchers, properly receipted by the creditor and certified to as correct by the president of the provincial board of health, will

be forwarded by the latter for payment at the end of each month to the commissioner of public health for such ice as may have been purchased locally during the month.

73. Vaccine virus will ordinarily be shipped from Manila on ice to those vaccine virus supply substations, and also to remote provinces in which vaccinations are being conducted in the suppression of epidemics of smallpox, in specially constructed portable ice boxes holding 100 pounds of ice each. These boxes will be shipped locked, a duplicate key to the locks being in the possession only of the president of the provincial board of health and the supply clerk of the vaccination service, Manila. On arrival, the vaccine virus and ice will ordinarily be transferred immediately to the refrigerator of the vaccine virus supply substation, and the empty portable ice box returned by the first transportation to the commissioner of public health, so as to be promptly available for sending out further shipments of vaccine virus. Ordinarily it should, if possible, be returned on the same boat on which shipped from Manila. If the portable ice box and vaccine virus on ice is, however, sent to a province in which there is no vaccine virus supply substation, and the virus can not be immediately used, the president of the provincial board of health is authorized to retain this ice box for the purpose of preserving the ice and virus for a period of not to exceed one week, or until the first opportunity for its return to Manila after the expiration of that period.

74. When a supply of vaccine virus is sent from Manila on ice, the president of the provincial board of health will be notified by telegraph of the date of shipment and name of the vessel on which shipped, and will take the necessary steps to immediately secure the ice box and virus on arrival of the vessel. When an empty portable ice box is returned by him, the date of shipment and the name of the vessel on which shipped will be telegraphed to the commissioner of public health, so that the ice box may be secured without delay on its arrival at Manila.

75. Where vaccination is being carried out in a remote part of the province requiring more than two days to reach, but to which there is water transportation, vaccine virus should be sent on ice in a portable ice box to the vaccinators, the ice box being promptly returned by them to the president of the provincial board of health. When vaccine virus is sent out to vaccinators they should, if possible, be notified in advance of its shipment, and be informed as to the place to which shipped and probable date of arrival, so that it may be secured without delay.

76. Under authority from the commissioner of public health, vaccine virus may be supplied from a vaccine virus supply substation to provinces adjacent to the one in which such supply substation is located.

77. Ordinarily the method of supplying vaccine virus will be by small shipments sent frequently to diminish the danger of spoiling before use. The shipment of large lots of vaccine virus, except on ice, to vaccine supply substations is not approved.

78. All expenses of the shipment of ice and of vaccine virus on ice will be paid from the appropriation made for that purpose.

Probably no more important undertaking was ever assumed by a board of health than that provided for in these circulars.

After the departure of Captain Munson, who, on account of impaired health caused by overwork, was ordered to the United States by the Surgeon-General, this important work was placed in the hands of Dr. Thomas R. Marshall, chief health inspector for the Philippine Islands, who has made such modifications in the published schedules as have been indicated by the exigencies of the service.

THE INFLUENCE OF VACCINATION UPON HUMAN LIFE.

Dr. C. A. Lindley, secretary-treasurer of the Connecticut board of health, one of the leading authorities on sanitation in the United States, quoting in part from a recent book entitled "A Concise History of Smallpox and Vaccination in Europe," by Dr. Edward T. Edwards, member of the Royal College of Physicians, says in his annual report for 1903:

There is nothing in all the literature of public hygiene more interesting to the sanitarian, or of more weighty import to the well-being of mankind, than the results which the practice of vaccination has produced. The records of the last two hundred years sustain the statement that vaccination has accomplished a more amazing and stupendous transformation in the conditions of human life than any other single event of historic times.

The alleged transformation consists in that during the eighteenth century and before smallpox was a disease of childhood almost exclusively. There were few that passed the seventh year of life without having it. The adult population was for the most part the survivors of an attack in childhood. Now the disease is very largely a disease for adults.

Before vaccination smallpox was universal, or nearly so. Now whole nations are exempt from it, and except at intervals it is very rare. Before vaccination it was among the most fatal diseases. In Berlin, during seventeen years, from 1758 to 1774, the deaths from all causes numbered 81,133, of which 6,705 died of smallpox, more than 8 per cent, or nearly one-twelfth; of these only 45 were over 15 years old. Jurin showed from the London register that every fourteenth child died of smallpox and that every fifth or sixth case was fatal.

About one-twelfth of the total mortality from all causes was due to smallpox. In London (1721–1796), of 1,759,298 deaths from all causes, 158,002, about one-eleventh, died of smallpox. The average for the century was one-twelfth.

ASIATIC CHOLERA.

The beginning of the year 1902 found the sanitary outlook in the Philippine Islands very hopeful. Plague, which had been prevalent in the city of Manila since December 26, 1899, had practically disappeared. This satisfactory state of things was unexpectedly changed by the appearance of Asiatic cholera.

The chief quarantine officer was notified on the 3d of March that Asiatic cholera was in Canton, China, and five days later it was reported to be in Hongkong. As Manila was dependent to a considerable extent upon Canton for its supply of green vegetables, the officer representing the United States quarantine service at Hongkong was notified that no vegetables not certified by him would be admitted, and an order was issued by the chief quarantine officer of the Philippine Islands on March 19 absolutely forbidding the importation of green vegetables, and the commissioner of public health, as an extra precaution, instructed his subordinates to report all persons suffering from bowel troubles of a suspicious character.

On March 20, at 2.30 p. m., notice was received from the San Juan de Dios Hospital that two patients in that institution were developing symptoms of Asiatic cholera.

The secretary of the board of health proceeded at once to the hospital, and the coinmissioner of public health, the chief health inspector, the superintendent of government laboratories, and the director of the biological laboratory followed within an hour. Specimens of the dejecta from the patients were taken by the director of the biological laboratory and cultures were prepared immediately upon his return to the laboratory, and the following morning it was known to the officials that the disease was Asiatic cholera. In the meantime two more cases had developed. The secretary of the interior informed General Chaffee that four cases of cholera had occurred in Manila and requested that an adequate force be held in readiness to proceed to Mariquina Valley for the purpose of protecting the water supply of the city of Manila. Additional cases continued to occur, and on March 22 the director of the biological laboratory sent the following official communication to the commissioner of public health:

MANILA, P. I., *March 22, 1902.*

The COMMISSIONER OF PUBLIC HEALTH, *Manila, P. I.*

SIR: I have the honor to inform you as follows in regard to the recent examination of cases of suspected cholera:

During the evening of March 20 I was notified that there were two cases of suspected cholera lying in the San Juan de Dios Hospital. On investigation these two cases proved to be male Filipinos, one about 45 and the other 24 years of age.

It was ascertained that the former had been taken sick early in the morning of March 20 with violent purging and cramps in the abdomen. He had been removed to the hospital early in the day suffering with a severe diarrhea and cramps in his legs. On examining the patient at 9 p. m., March 20, he was found to be in a state of extreme collapse. The skin was cold and bathed with perspiration. The rectal temperature registered 102. No pulse could be felt at the wrist and the heart sounds were very rapid and feeble. He was already unconscious. An examination of the rectum showed no discharge, and it was stated that there had been no bowel movement for about six hours.

A cover-glass preparation was, however, made from the rectal mucosa and examined microscopically. While a few organisms present possibly resembled morphologically the spirillum of Koch, the majority did not suggest this organism.

An examination of the other patient (Case II) showed a somewhat similar condition to the first. He was still, however, conscious, and stated that he had been attacked with severe diarrhea, cramps, and vomiting the previous night (March 19). There had been no diarrhea since morning. He complained of great thirst and the voice was very husky. The skin was cold to the touch and no pulse was perceptible at the wrist. An examination of the chest showed rapid, feeble heart sounds. The abdomen was retracted.

These cases were regarded as very suspicious ones from a clinical standpoint, but as attacks of cholera nostras have occasionally been observed before in Manila a bacteriological examination was most desirable. As there was also no discharge from the bowels in this case, and no soiled linen among the bed clothes, an attempt was made to secure a rectal speculum, or rectal tube, in order that satisfactory material for a microscopical examination might be secured.

At this time, while a search was being made in the hospital for these instruments, a telephone message was received stating that a native had just died under suspicious circumstances in one of the districts near by and that the body was then on the way to the morgue. The further examination of Case II was, therefore, deferred in order that an autopsy might be performed on Case III as soon as possible.

Case III.—The necropsy on this case took place about one hour after death. The body was still warm, but rigor mortis was already marked. The following is a brief summary of the more important changes found present:

The intercostal muscles were dry and red in color. The right chambers of the heart were distended with dark, clotted blood. The bases of the lungs were congested. Upon opening the abdominal cavity the serosa of the ileum and jejunum presented a rose-pink color. The small intestine was dilated, but the large bowel was contracted and pale grayish in appearance. The blood vessels of the small intestine were markedly injected. On opening the ileum a large amount of watery fluid containing whitish flakes escaped. The solitary follicles were swollen and reddened, particularly at their margins. There were many small diffuse hemorrhages in the mucosa. This process continued nearly through the jejunum. The mucosa of the large intestine was in general pale gray in appearance, but its vessels were injected and numerous small hemorrhages were present. The spleen was small and firm. The capsules of the kidneys stripped easily. The kidneys were much congested and their surface vessels deeply injected. The stomach was distended with gas and contained a small amount of fluid. Its mucosa showed a few small superficial hemorrhages. The liver showed moderate cloudy swelling. The mesenteric glands were not particularly swollen. Cover-glass preparations were made from the mucosa of the ileum and from the spleen. Those from the latter were negative for organisms. The former showed a number of comma-shaped bacteria, but there were also a large number of other organisms present. Cultures were made from the spleen and from the small intestine in Dunham's solution.

Shortly after midnight, and just before the completion of the above autopsy, a second case was brought to the morgue.

Case IV.—This body was also examined. Moderate rigor mortis was present. The abdominal cavity was free from fluid. The spleen was small and firm. The liver showed cloudy swelling. There was moderate atheroma of the arch of the aorta and congestion of the lower lobe of the left lung. The vessels of the mesentery and of the small intestine were deeply injected. The mucosa of the latter showed numerous diffuse bright hemorrhages, but the swelling of the solitary follicles was not so marked as in Case III. The mucosa of the large intestine also showed numerous hemorrhages, but was elsewhere in general pale in color. Cultures were also made from the intestines of this case.

On arriving at the laboratory pure cultures were made from the Dunham's tubes, inoculated with material from the small intestines of Cases III and IV. At 9 a. m. of the same day, an examination of the culture tubes inoculated from the spleen showed no growth. In those from the small intestines of Cases III and IV there was a distinct cloudiness of the media. Hanging-drop preparations made from the top of the media showed a motile bacterium often curved in shape and occasionally appearing in S-shaped forms. Stained preparations showed a comma-shaped organism measuring about 4 microns in length by four-tenths

micron to five-tenths micron in thickness. Preparations made from the colonies which had developed on the plates inoculated with the intestinal material showed the spirillum to possess but a single terminal flagellum. Several large loops from the plate colonies were suspended to 1 cm³. of salt solution and injected into the abdominal cavity of a guinea pig. The same amount was injected into the breast muscles of a pigeon.

Cultures in glucose, agar, and Dunham's solution were prepared from colonies on the plate cultures, and in the latter media also from the upper portion of the original tubes of peptone solution inoculated from the intestine at necropsy. On Friday afternoon the Dunham's tubes all showed a marked indol reaction on the addition of specially prepared nitrite-free sulphuric acid, while the glucose-agar tubes showed no gas production.

It was, therefore, reported verbally to the board of health that probably the spirillum of Asiatic cholera had been isolated.

On Saturday morning the guinea pig was found dead. During the afternoon before its temperature had been subnormal. On autopsy there was a large amount of cloudy serous fluid in the abdominal cavity. A hanging-drop preparation showed very large numbers of comma and spiral-shaped bacteria, all clumping in the serous exudate. The pigeon was still alive and has since remained well.

Case I died on Friday morning, and the autopsy showed in general a somewhat similar condition to that observed in Cases III and IV. The large intestine, however, showed more numerous and extensive hemorrhages. There was a large amount of rice-water material in the small intestine. Cover-slip preparations from a floccule of mucus in the ileum showed almost a pure culture of comma and spiral-shaped organisms. Cultures in this case have revealed an organism similar to that isolated from Cases III and IV.

Case II is still alive and apparently recovering.

I therefore have the honor to inform you that cases of Asiatic cholera have occurred in Manila, and that the spirillum of Koch has been isolated and obtained in pure culture from these cases.

Very respectfully,

RICHARD P. STRONG,
Director of the Biological Laboratory.

There were many people in Manila, some of them physicians, who persistently refused to believe that the disease was Asiatic cholera, and offered many fanciful explanations, one of which was that "a disease of this kind came every year just before the rains." On April 2 the commissioner of public health, for the purpose of abating these disquieting rumors, sent the following official inquiry to the director of the biological laboratory:

Lieut. RICHARD P. STRONG,
Director of the Biological Laboratory, Manila, P. I.

SIR: I have the honor to request that you furnish me with a report of cases of cholera examined from the beginning of the epidemic to March 31, with a statement as to what you have found, and whether the disease is actually Asiatic cholera or not. A brief report from you on this subject is necessary for the reason that a large number of people in the city of Manila, among whom are some physicians, including several Americans, do not believe that Asiatic cholera exists at present in the city of Manila, and are disquieting the people to a certain extent for that reason.

Very respectfully,

L. M. MAUS,
Commissioner of Public Health.

In reply to this communication the commissioner of public health received this letter:

BIOLOGICAL LABORATORY,
Manila, P. I., April 2, 1902.

The COMMISSIONER OF PUBLIC HEALTH, *Manila, P. I.*

SIR: In reply to your communication of April 2, I have the honor to inform you that since the outbreak of Asiatic cholera in the city of Manila on March 20, 1902, autopsies have been performed on all bodies brought to the cholera morgue. In 84 of these cases the pathological-anatomical lesions of Asiatic cholera have been found present. Pure cultures of the spirillum of Asiatic cholera isolated from them, as well as the anatomical material collected from them, may be seen by physicians at the government biological laboratory.

Very respectfully,

R. P. STRONG,
Director Biological Laboratory.

Thus began the cholera epidemic of 1902–1904, the suffering and financial loss of which is beyond estimate. Up to April 27, 1904, when the Philippine Islands were declared to be free from cholera, there were officially reported 166,252 cases, with 109,461 deaths, or a death rate of 65 per cent. Because the disease was not so prevalent as in other epidemics, many persons who ought to have known better were reluctant to admit its true nature, and probably the deaths of thousands of its victims have been ascribed to other causes. Many municipalities had no sanitary organization at the time, and in others, especially those belonging to the non-Christian tribes, no sanitary records whatever were kept. There is scarcely any doubt that in many instances cases were hidden and burial permits for the dead obtained upon false returns with reference to the cause of death, so that their friends and families might evade the annoyance and inconvenience of quarantining and disinfection. In view of these facts the official figures can not be accepted as entirely correct.

THE EPIDEMIC IN MANILA.

In the city of Manila, from March 20, 1902, when the first case was reported, to March 23, 1904, when the city was declared by the board of health to be free from cholera, there were 5,581 cases and 4,386 deaths reported, giving a mortality of 78.5 per cent. Three thousand six hundred and two of the cases were males, of whom 2,833 or 78.6 per cent died, and 1,965 were females, of whom 1,547 or 78.7 per cent died.

There were 14 cases and 6 deaths in which the sex was not given.

The excess of males over females may be explained by the fact that the former were more exposed to the infection on account of their occupations as sailors, stevedores, boatmen, and laborers along the water front, and to the greater liability of contracting the disease in the small tiendas to which they usually went for their midday meal.

The following tabular statement will show the number of cases in Manila and the mortality, race by race:

Race.	Cases.	Deaths.	Case Mortality.
			Per cent.
Americans	173	85	49.1
Foreigners	106	62	58.4
Filipinos	4,888	4,031	82.6
Chinese	405	206	50.8
Not stated	9	2	

The figures by races show that the Filipinos were more susceptible to the disease than other races, and that the percentage of deaths is much higher in Filipinos than in others. The number of Chinese, in proportion to the population, who have contracted the disease is relatively small. This is probably due in part to the fact that the Chinese drink boiled water in the form of tea, and eat very little uncooked food.

The number of Americans who developed the disease is relatively large; the greater number of cases, however, occurred among soldiers and others who visited or lived with native women, and ate and drank food and water that were infected. In other cases, Americans were

foolish enough to believe that the use of alcoholic drinks was a preventive against cholera, and many lives were sacrificed through this erroneous idea.

The total number of cases and deaths, by districts, for the entire period covered by the epidemic were as follows:

No.	Health district.	Cases.	Deaths.	Case mortality.
				Per cent.
1	San Nicolas	1,179	977	82.86
2	Tondo	1,204	989	82.14
3	Quiapo	568	421	74.13
4	Santa Cruz	733	568	77.48
5	Sampaloc	451	356	78.93
6	Intramuros	320	187	58.43
7	Ermita	791	561	70.92
	On boats in river and harbor	292	224	76.71
	Not stated	43	104	

The number of cases has maintained a relative proportion to the number of inhabitants except in San Nicolas, in which the usual proportion is exceeded. This may be explained, in part, by the probability that many cases developing on boats along the water front were removed to the shore before they were discovered, and in this way recorded as belonging to San Nicolas district.

The records show considerable variance in the rate of mortality. In 1902 the mortality was 80.7 per cent; in 1903 it was 85.6 per cent, and in 1904 it was 91.2 per cent.

The cases occurring in Manila during the epidemic, classified, were as follows:

Age.	Cases.	Deaths.	Case mortality.
			Per cent.
Under 1 year	46	44	95.65
1 to 10 years	766	637	83.15
10 to 20 years	894	640	71.58
20 to 30 years	1,747	1,268	72.00
30 to 40 years	1,024	760	74.21
40 to 50 years	489	381	77.91
50 years and over	495	390	78.78
Unknown	120	266	

It is apparent from these figures that early adult life offers the best chances of recovery, while the extremes of life are most unfavorable.

Through the efforts of the board of health, aided by the military authorities, the city water supply has been kept free from infection, thus saving thousands of lives. The esteros of the city and the Pasig River were infected, as proved by bacteriological tests, making it very difficult to control and keep the epidemic within the limits shown by the figures presented, which are practically accurate so far as Manila is concerned. The measures adopted for suppressing the epidemic were thorough enough to have been effective under ordinary conditions. The city was divided into 12 districts for the purpose of inspection and a medical officer and a corps of sanitary inspectors varying from 30 to 60 were placed in each district. House-to-house inspections were made both day and night, in order to prevent cases

from escaping the notice of the sanitary authorities. This was necessary in order to detect those cases that were concealed by their relatives or friends, presumably to evade the regulations in reference to the cholera hospital and the detention camp.

A request was made of the division commander for the detail of medical officers, and from time to time such physicians as could be spared by the chief surgeon were ordered to report to the commissioner of public health. In all, 31 were detailed during the first ten days of the epidemic and were assigned to duty as district medical inspectors, quarantine officers in the bay, rivers, and esteros, in charge of cholera hospitals and detention camps, and to those provinces in which the disease had appeared. Each district medical inspector was supplied with a disinfecting pump and disinfectants, and with a corps of men familiar with their use.

Every house in which a case of cholera occurred was thoroughly disinfected after the case and contacts had been removed, and closed against occupancy for five days.

In addition to the measures enumerated, the following precautions were taken: (*a*) All wells in the city were closed and distilled water distributed for drinking purposes; (*b*) fruits and vegetables which could be eaten raw, such as pineapples, pears, chicos, watermelons, apples, radishes, lettuce, cabbage, celery, eggplant, tomatoes, peppers, cucumbers, green onions, turnips, water cresses, and sugar cane, were prohibited and a strict inspection made several times daily of all shops and markets in the city; (*c*) hotels, boarding houses, lodging houses, saloons, and other public places were prohibited from using for drinking purposes water that had not been boiled or distilled; (*d*) rigorous quarantine was placed around the city of Manila to prevent the escape to neighboring towns of those who were infected; (*e*) all cascoes, lorchas, barges, launches, and other shipping were required to move out of the Pasig River after 5 p. m. and remain in the bay during the night, where they were thoroughly inspected before being allowed to return to their wharves or moorings the following morning. This course was taken because a large number of cases had occurred on such craft without having been reported to the board of health, the bodies of the victims being thrown overboard during the night in order to prevent detection.

PROTECTION OF WATER SUPPLY.

The Mariquina River, from which the city water is obtained, was thoroughly guarded by civil inspectors of the board of health, and also by a patrol of cavalry. The pueblos of Montalbon, San Mateo, and Mariquina are located on the river above the intake, therefore in guarding the water supply in order to prevent infection it was necessary to subject these pueblos to a rigid system of inspection. Later on, at the request of the board of health, a battalion of infantry was sent to guard the river on both sides from the intake to Montalbon.

DETENTION CAMP AND CHOLERA HOSPITAL.

A detention camp had been built on the grounds at San Lazaro during the preceding winter for the detention of plague contacts, but owing to the disappearance of that disease had not been used. This camp had a capacity of 2,500, and was provided with kitchens, water-

closets, bathing facilities, and other conveniences, and answered every purpose of a cholera detention camp.

The first cholera hospital was located on the outer side of San Lazaro Hospital, in the campus, and consisted of hospital tents. It was thoroughly equipped with medical officers, trained nurses, and competent attendants, and during its existence 172 cases were cared for before it was removed to a better site at Santa Mesa, generously donated by Señor Juan M. Tuason. The treatment at the hospital consisted of the administration of enemata of 1–1000 solution of acetezone, a new chemical product discovered by Professors Freer and Novy of the University of Michigan, hypodermics of strychnine, and the application of hot-water bottles, and the use of other remedies to meet symptoms as they occurred. The dead were either cremated or buried in hermetically sealed caskets in chloride of lime.

EMPLOYMENT BUREAU.

The board of health established an employment bureau, through which during the first two weeks over 1,500 men, nearly all Americans, were given employment as sanitary inspectors, many of whom had to be discharged for the good of the service during the first few days of their service. Their places were taken by others until the pay rolls showed about 5,000 employees.

QUARANTINE.

There is no doubt that quarantine is the most effective measure that can be used against the spread of cholera, but to be of value at all it must be absolute, that is, against the sick and well alike. There can be no further doubt that apparently healthy men may carry and disseminate the infection of cholera and never develop the disease themselves.

The rigorous measures employed by the board of health provoked bitter opposition, yet they were not strict enough to prevent the spread of the disease. For weeks, even months, many persons, for one reason or another, denied that the disease was cholera. Absurd stories were circulated and gained credence among the lower classes, thus making the task of the health authorities more difficult.

Taking everything into consideration, the cholera situation in Manila was handled remarkably well. The Spanish residents established a hospital where their sick might be cared for by their own physicians, under the general supervision of the insular board of health, and later the board of health transferred their hospital to an unused portion of the building occupied as a cholera hospital by the Spaniards, and thus founded the noted Santiago cholera hospital, which later was abandoned and the patients transferred to the new San Lazaro hospitals for infectious diseases, one of the leading institutions of its kind in the Orient.

The cholera epidemic in Manila officially came to an end on the 23d day of March, 1904, when the following resolution was passed by the board of health:

Whereas the last case of Asiatic cholera occurred in the city of Manila on February 29, 1904, there having been but four positive or suspected cases of Asiatic cholera in the city of Manila since January 6, 1904; and

Whereas the provinces adjacent to Manila have been free from cholera during the present year: On motion

Resolved, That the city of Manila is, and is hereby declared, free from the infection of Asiatic cholera.

CHOLERA IN THE PROVINCES.

During the early days of the epidemic in Manila, quarantine guards were placed on all roads, paths, and streams leading out of the city, a water patrol was maintained on the bay, and all vessels leaving Manila were quarantined for the regulation period of five days at Mariveles, and for a longer period if the disease developed on board. No one except health officers was permitted to leave the city without a pass. The efforts of the board of health served to retard the progress of the disease, but it was impossible to prevent native canoes from breaking the regulations at night, or to prevent the escape from the city of pedestrians if they left by the way of the fields, therefore it is not strange that the disease made its appearance in Bulacan Province as early as March 23, and in Cavite, March 27; Bataan, March 28; Ambos Camarines and Rizal, April 2; Laguna, April 7; Pampanga, April 13; Pangasinan, April 24; Tarlac, April 28; Nueva Ecija, May 8; Leyte, May 9; Batangas, May 24; Samar, May 29; Mindoro, June 10; Tayabas, June 13; Zambales and Marinduque, July 1; Benguet, July 4; Cebu, July 14; Union, July 15; Occidental Negros, August 26; Iloilo, August 28; Surigao, September 5; Capiz, September 8; Oriental Negros, September 29; Misamis and Antique, October 2; Sorsogon, October 15.

In some cases the method of transferring the infection could be traced, but in others the exact means are still a matter of doubt. It was impossible to make the quarantine absolute; an army of trained soldiers could hardly be expected to succeed in such an undertaking under existing conditions, so in spite of the vigilance of the sanitary authorities, the infection was carried from island to island by steamers and fishing boats, and into the interior by canoes, bull carts, and pedestrians. Once the disease had broken through the quarantine lines around Manila, it was practically beyond control. Land quarantine proved almost useless, and sea quarantine only served to delay the progress of the epidemic; it is impossible in these island waters to establish, so long as the people are not in sympathy with the same, a quarantine that can not be evaded by small boats and cunning natives. The result in the province of Lepanto-Bontoc gives an example of the efficiency of a complete quarantine. This province can be reached only by means of a few narrow trails, which were so carefully guarded, that notwithstanding the fact that the disease was in adjoining provinces, it escaped entirely. The spread of the disease through the archipelago was the result of the unwillingness of the people—not always natives—to carry out the necessary measures to prevent it. This unwise and mistaken attitude is responsible for the sacrifice of thousands of lives and for untold suffering and great financial loss.

To give a complete history of the epidemic in each province would require more space than that offered by the limits of an annual report. Therefore only a few extracts have been made from the reports of the presidents of the provincial boards of health, and arranged according to the dates upon which the disease reached the provinces.

Bulacan.—On March 3, 1902, shortly after the outbreak of the epidemic in the city of Manila, a man who had come from that city died of cholera in Malolos, the capital of Bulacan Province, and on the 25th another man, who also had come from Manila by way of Malabon, died of the same disease. From that time the epidemic began to spread with such rapidity that on April 8, 1902, it reached the maximum, 35 cases being registered, after which time it rapidly decreased, so that only 1 case was reported on the 27th of the same month.

Rizal.—The first town that became infected in the province was Malabon, where the disease was brought from Manila two or three days after the first cases occurred in the city. According to a report of Doctor Pond, dated May 21, 1902, there were many cases in this town, the greater part of them being contacts who were undergoing quarantine. During the first days of June the cholera disappeared from Binangonan and continued in a mild form in Morong, with a daily average of 2 cases.

Toward the 24th of June Mariquina was also infected; 29 cases had already been registered at that town, and during the first days of November the epidemic spread to Calumpang, where the highest number was 7 cases per day, and 1 or 2 in the small barrios. In December, 1902, the epidemic continued in the towns of Baras, Cainta, Tanay, and Pasig in a mild form, only 33 cases with 28 deaths being registered.

Ambos Camarines.—On March 30, 1903, the steamer *Castellano* arrived from Manila at Nueva Caceres, the capital of the province, and on the next day one of the crew was attacked with cholera. The steamer was thereupon placed in quarantine, but on the next day, April 1, notwithstanding the precautionary measures that had been taken, another case developed in the market of the town. The market was burned, and all the persons who were found in the same were taken to the quarantine station. From this date the epidemic was rapidly propagated; the largest number of cases was registered on April 14, when it reached 19; and the largest number of deaths was registered on the 16th, when it reached 12. From this time the epidemic decreased rapidly, and the number of cases and deaths, which were 159 and 106, respectively, during the twenty days of April, went down to 15 cases with 7 deaths during the last ten days. During the month of May only 8 cases and 7 deaths occurred. Soon after its outbreak in Nueva Caceres the epidemic rapidly spread to the other towns of the province, with the exception of Daet, where it did not appear until December, 1902.

The towns in which the disease prevailed with the greatest violence were Magarao, Nueva Caceres, Libmanan, Bombon, Milaor, Minalabag, Calabanga, Quipayo, Nabua, Pili, Bulan, Baao, Gainza, Pamplina, San Fernando, Tigaon, Sanjay, and Sipucot. These last four towns did not become infected until the month of May. The towns of Magarao and Nueva Caceres registered the largest number of cases in April, and Daet in December.

During the period between April, 1902, and April, 1903, the epidemic constantly prevailed in Nueva Caceres and Nabua, while it had practically disappeared from the other towns in October, reappearing in Iriga and Baao in January, 1903. During the first two months 895 cases were registered and 648 deaths; the cases decreased

to a very few during the following months, excepting in the town of Nabua, and during the month of December in the town of Daet.

The methods employed in this province may be taken as fairly representative of those employed throughout the archipelago, and are here given somewhat in detail. Dr. Shannon Richmond, now president of the provincial board of health in Albay, was at the time of the outbreak of the epidemic in charge of health matters in the province of Ambos Camarines, and most of the circulars and instructions here given emanated from his office.

A strong cordon, consisting of municipal police and constabulary, was placed around the city of Nueva Caceres, while a military guard patrolled the river front. No one was permitted to pass the cordon without a pass, and very few passes were given. In order that commerce might not be too greatly interfered with, and that those living in the towns surrounding might not suffer for want of food, no rice being grown in this province, and Nueva Caceres being the only port in the vicinity, the following arrangements were made: Three stations were established where the transfer of supplies might be made, each of these being under the personal supervision of an American inspector, usually a school-teacher, one station being at the river landing, one on the road leading north, and the third on the road leading east. Supplies were brought to the cordon, where they were to be deposited while the bearer was to withdraw a distance of 20 feet. The person on the other side of the cordon was then to advance and receive the goods. The hours of transfer were from 8 to 11 a. m. and 2.30 to 5.30 p. m. daily. All boats of whatever description were carefully inspected by a medical officer before those aboard were allowed to land, he being the first to board the boat.

The city was divided into districts, each being in charge of an American inspector who, accompanied by native practicantes and two policemen, started out early each morning and made a house to house inspection of the district, sending back one of his policemen with notice of the fact when he found any cases or deaths, while the other policeman remained to guard the house. The most of these inspectors, about fifteen in number, were American school-teachers, who volunteered for the work, and rendered invaluable assistance, working both day and night.

A board of prominent citizens was appointed for the purpose of raising a subscription fund for the relief of cholera patients and those dependent upon them for support, by which means $2,115 Mexican currency were collected, of which $1,000 were paid by Chinese residents, $465 by Americans, $430 by Spaniards, and the balance, $220 by Filipinos. Most of this money was used for the construction of an isolation camp and for the purchase of food for those under surveillance there.

The municipal president issued an order to the effect that all cases of illness, of whatever description, be reported at once, whereupon a medical officer visited the house and ascertained whether or not the disease was cholera. The bodies of all deceased were viewed, and if death was not the result of cholera, a permit to bury the remains were given. The church authorities were forbidden to hold services over the remains unless accompanied by the permit.

It having been found next to impossible to obtain fresh lime, all

bodies of cholera cases, with the exception of two or three, which were buried in fresh lime, were burned, the cremating being generally done at night under the supervision of four discharged colored soldiers, who were employed as inspectors. A pit was dug, into which was placed half a cord of wood, the body placed on this, covered with 5 gallons of coal oil, and within two hours would be entirely reduced to ashes.

The following circular of warning was issued March 24, 1902, the fourth day after the outbreak of cholera in Manila:

To all municipal presidents:

Asiatic cholera has appeared in Manila, and it is necessary that the strictest precautions be taken to prevent its introduction into this province. Therefore, you are directed to at once proceed to place your town in as nearly perfect sanitary condition as possible. Have it thoroughly cleaned, and use the strongest measures to prevent the committing of nuisances and depositing of filth in the streets and private premises. Warn your people to use only well-cooked foods and boiled water.

If any suspicious case occur, isolate it at once, and report same immediately to this office and to the board of health in Manila if you have telegraphic communication.

If your town is an open port, exercise a rigid inspection over all vessels, and permit no one to land without strict examination; and in case of cargo from Manila or China do not hesitate to destroy or forbid entry in case of suspicion.

A grave danger menaces the province, and therefore all officials will be held to the strictest accountability for the efficient performance of their duties.

In regard to sanitary arrangements and cleaning your town, the lack of municipal funds will not be accepted as an excuse for nonperformance. If not sufficient funds in treasury to pay laborers, you must require the people to assist by contributing labor.

The following military order was sent to all parts of the province:

HEADQUARTERS DIVISION OF THE PHILIPPINES,
Manila, March 25.

COMMANDING-GENERAL FOURTH SEPARATE BRIGADE,
Nueva Caceres.

Following orders issued to-day:

"General Orders, No. 66.] HEADQUARTERS DIVISION OF THE PHILIPPINES,
"*Manila, March 25.*

"In view of the presence of cholera in the city of Manila the civil officers of the Philippine Islands have requested from the commanding general the cooperation of all medical officers in the division, with a view of limiting the spread of and to stamping out this disease. As means to this end, all medical officers are hereby announced as members of boards of health, and will be guided by the following instructions: By virtue of their authority in such boards they will have charge of the sanitation of the towns in which they are stationed. Under their advice and supervision all such towns will be placed in the best sanitary condition possible. This will be done in cooperation with the board of health, when such a board has been organized. When such board is not organized, they will take steps at once to constitute such boards. In the sanitation of towns, special attention will be paid to water supply, noncontamination of food, and the removal of fecal matter and garbage, with burial at a distance from the towns. Great care will be taken that no fecal matter reaches streams. The details of these and other sanitary measures will be left to the individual medical officers. A site for a detention camp will be secured in each town. This may be met by putting up a temporary bamboo and nipa shelter at an isolated spot, or better by obtaining an isolated house. On the appearance of a case of cholera, all persons who have been in contact with such case, except necessary attendants, will be removed to said camp. The sufferer from the disease may be left in his house until his recovery or death. In the latter case the body will be burned or buried in quicklime. If the house in which the case occurred is of nipa, it will be burned; if of wood, carefully disinfected. In towns attacked by cholera all water will be boiled; all sales of vegetables which are not cooked in their preparation for the table will be prohibited, and all such vegetables on hand will be destroyed. Medical officers will organize boards of health in all towns contiguous to stations where boards have not already been organized, and will cooperate in the work of such boards in the same manner as in the towns in which they are stationed. An immediate telegraphic report will be made to the chief surgeon of the division on the appearance of cholera. Commanding officers of stations are directed to give every assistance in the carrying out of their work so necessary in limiting the ravages of the disease.

"By command of Major-General Chaffee."

Another circular of importance was issued on April 1, as follows:

The PRESIDENT OF NUEVA CACERES:

SIR: Under instructions recently received from the insular government at Manila, a special provincial board of health has been organized for the purpose of taking precautions against the entry of Asiatic cholera into this province. This board has adopted the following health regulations, which you will bring to the attention of the council of your town and see that same are rigorously enforced:

1. Impress upon the people the necessity of securing the best sanitary conditions possible, so that in the event a case of cholera develops it will not find favorable conditions in which to spread.

2. Instruct the people that danger of contracting the disease especially lies in water contaminated with fecal matter, and that whenever possible all water should be thoroughly boiled before drinking, and that raw food, either animal or vegetable, should not be eaten, but all foods should be carefully cooked.

3. Order a general cleaning of all residences, business places, streets, and institutions of every character, which cleaning should be completed before April 7, on which date a house-to-house inspection will be made by a member of the board of health, and as often thereafter as may be advisable. Every householder will be held strictly responsible for the proper cleanliness and sanitation of the premises occupied by him.

4. All defecating, urinating, and laundrying in open canals and drainage ways of the city or barrios must be strictly prohibited, and any violation of this regulation by citizens or by minor children under their custody, will be punished according to law.

5. All unclean sinks, dumping spots, or insanitary nuisances of whatever nature must be cleaned at once, and all open gutters thoroughly cleaned and then flushed with water.

6. The market must be thoroughly cleaned, and the residents and occupants of that part of the city required to keep their premises in a clean condition. The custom of throwing decayed vegetables and refuse on the ground in the market and its vicinity must be stopped, and all said matter must be collected in a selected spot and carefully burned.

You will inform the city council and all officials that this matter is of the greatest importance, and that it is the intention of the insular government to hold all officials, both provincial and municipal, to the strictest accountability for the proper performance of their duties.

A special committee appointed by the provincial board of health of Ambos Camarines submitted the report given below to the provincial governor, who caused it to be circulated as a proclamation throughout the province:

NUEVA CACERES, P. I., *April 15, 1902*

His Excellency JAMES ROSS,
Governor, Ambos Camarines.

SIR: In addition to the report recently submitted, the special provincial board of health has the honor to submit the following for the information and guidance of residents of this province, particularly those living outside of Nueva Caceres. A large number of cases of Asiatic cholera have developed in this city since April 1, and in order to prevent its spread throughout the province, it is of the utmost importance that these recommendations, as well as those formerly made, be faithfully carried out.

1. Cholera being essentially a filth disease, it is of prime importance that all towns be thoroughly cleaned and placed in the best sanitary condition possible. The practice of throwing water and slops beneath kitchens is a particularly pernicious one and should be checked. All gutters or small ponds within the town which contain stagnant water should be drained, and all fecal deposits made at a considerable distance from the house, and, if possible, burned. Fecal matter should never be thrown into or near rivers, streams or wells, as the infection is most liable to be carried by means of the water which is drunk. Therefore, before being drunk, all water should be thoroughly boiled and allowed to cool. The market place should be thoroughly cleaned, the refuse therefrom being burned daily. No vegetables of any kind should be eaten uncooked.

2. The onset of cholera may be sudden, the patient being seized with severe cramps in the abdomen and legs, diarrhea, vomiting, great prostration, and in this condition may die in two or three hours. In such severe cases diarrhea and vomiting are not infrequently entirely absent. In another, which is the most common form, the symptoms are as above outlined, the patient either dying at the end of twelve or eighteen hours, or at that time undergoing a slight change for the better, and convalescing within a few days. Again, the first symptoms of the disease may be a slight diarrhea, lasting for several days.

3. The high mortality in Asiatic cholera is largely owing to the fact that energetic measures are not instituted at once. The diarrhea can be lessened and the prostration and pain

relieved by a combination of 10 drops of laudanum and an half ounce of brandy every hour or two until the condition is ameliorated, after which the same should be continued at greater intervals. As the arms and legs are always cold, they should be first thoroughly rubbed with a mixture consisting of one part native wine and two parts cocoanut oil, after which they should be surrounded with bottles containing hot water, and the body thoroughly covered with blankets. Patients should not attempt to rise and use a vessel, but should defecate upon old clothes, these to be burned immediately thereafter.

Vomited matter should also be destroyed by fire. Vomiting and nausea, as well as the pain, can be relieved by placing mustard plasters over the pit of the stomach.

4. In every municipio there should be set aside a large nipa building for a hospital, to which all of those attacked should be carried at once. The other members of the family should be removed to the detention camp on the outskirts of the town, this camp to consist of a number of small houses and to be guarded by police, who should be instructed to allow no one to enter, aside from those who are to be kept there in quarantine. Arrangements should be made for feeding all there, and no one in the camp should be allowed to leave until the epidemic is entirely stamped out. Immediately after the patient and other members of the family are removed from the infected house, the building, if of nipa and bamboo, should be burned, this if possible on the ground where it stands. Should such burning endanger other houses, the building should be torn down and removed, and then burned. If of hard materials, the building can be disinfected instead of being burned. To disinfect a building, close it well, burn sulphur, or, if sulphur can not be had, rice straw, for several hours; scrub thoroughly with 10 per cent solution of carbolic acid, and then paint the entire interior, preferably giving it two coats. There is but one disposition to be made of the bodies of those who die—cremation. This can be effectually done by placing the cadaver on a pile of wood and brush, thoroughly saturating with 5 gallons of coal oil, and lighting with a match. Bodies can not be buried in the usual way, as the microbes would in time find their way to wells or streams, and one or two bodies so interred would infect an entire town.

The presidentes of the various towns should be instructed to see that the necessary orders are given for carrying out these instructions, especially as contained in paragraphs 1 and 4.

The following interesting circulars have been translated from the original issued by the Spanish authorities during the cholera epidemic of 1888, and circulated throughout Ambos Camarines, and presumably throughout the Philippine Islands:

RULES OF GENERAL AND PARTICULAR HYGIENE.

Rules recommended to all inhabitants of the entire archipelago, for the prevention, as far as possible, of cases of epidemic cholera, and for checking the effects that the said disease may produce.

The majority of the public know that the generally accepted theory regarding the real cause of cholera is a parasite, i. e. microbe, which once introduced into the organism and deposited in the digestive tract, develops and produces death, the latter, if the disease is not taken in time and energetically combatted, being preceded by a class of terrible symptoms.

The contraction or contagion of this disease is supposed to be caused by the inhalation of germs with the atmospheric air by means of the respiratory apparatus, by the imbibition of drinking water contaminated with the microbes, by swallowing food containing the germs, and above all, it is admitted that the disease is propagated by an infected person carrying it from place one to another, and by articles which have come in contact with those diseased, and which have become impregnated or soiled by cholera dejections or emanations.

In all seasons of the year, and especially in this country, the municipal ordinances concerning hygiene should be observed. This necessity is greatest in the towns which are threatened by a cholera epidemic.

The ordinary measures that the authorities have made use of in the towns are not sufficient in these extraordinary cases to prevent the spread of this disease, and it is necessary to adopt more stringent means in order to prevent the disease, as, owing to the carelessness and indifference of the ignorant classes, cholera once introduced spreads rapidly and produces death and desolation everywhere.

Aside from the necessity of taking said measures, much can be done by the local authorities and the residents of the towns, by observing and enforcing the hygienic regulations regarding cleanliness, as the latter, as well as food, has its relation to the spread of the disease, for, as everyone knows, the greater the neglect of sanitary precautions, the greater

are the ravages of the disease. Therefore, at all times, and especially when a disease is epidemic, the following regulations should be strictly enforced:

All residences are to be cleaned, after which they should be whitewashed with lime, which forms an impermeable surface and which is less absorbent than chalk and similar paints.

Guard carefully all infected houses, prohibiting the crowding of persons and animals, and so avoiding a dense and foul atmosphere, which is an appropriate vehicle for the spread and propagation of the disease germs. The houses of the Chinese residents in this country are undoubtedly the first and principal focus for the development of all diseases, and the strictest vigilance should be exercised over them to prevent them, as far as possible, being a menace.

The streets, plazas, promenades, after being swept, should be sprinkled three times daily—i. e., at 6 a. m., 11 a. m., and 4 p. m.—even though no epidemic prevails.

Dead animals found in the streets should be removed at once and buried at a distance from the pueblo.

Frequent inspections, by competent persons, of water and of food supplies should be made, destroying at once all that are found to be in bad condition.

The eating of fruits or vegetables unripe or overripe, and of all foods which are in any way harmful, should be prohibited, and the sale of the following prohibited: Uncooked or unroasted corn, green mangoes, cherries, "nanca," and of certain kinds of indigestible bananas (i. e., saba bungulan), the mixture of various fruits, vegetables, etc., called "guinatan," of the gelatinous food called "palitao," etc.

It is wise to abstain from the eating of various foods sold by Chinese and called "lumpia," "jopia," "calamay con arroz malaquit," "pansit," and badly prepared confectioneries and such things.

The source of the water supply is another matter of prime importance. The purest possible should be obtained. Adulterated milk should be guarded against, as well as bread in which the source of the water used is unknown. Milk and bread being important articles of diet, should therefore be of the best. As the former is often given to the sick, anyone selling impure or adulterated milk should be prosecuted, as such milk is often the cause of grave disorders.

All sweepings and refuse of every character should be removed daily to a point distant from the town and there buried.

There are many towns, and even capitals, which are not properly ditched, as a result of which pools of stagnant water are often to be seen in the streets, there being no means of drainage. This inconvenience could be remedied in part by the digging of deep wells at convenient distances, these to be covered, and to be in communication with all the small ditches, the latter to be made of stone and lime and also to be covered. Such have been constructed in Manila along the "Paseo de Magallanes," near the Walled City, and these convey the water to the moats surrounding the walls. These small pools of stagnant water are very prejudicial to the public health and have a marked influence over the same.

All that has been said regarding the refuse and filth applies also to the rears and sinks, and as the cleaning of latrines is not convenient it should not be done daily. Regarding the latter great care should be taken to destroy their prejudicial effects. They should be well inclosed and no water should be thrown into them, excepting possibly warm limewater containing one part sulphate of iron to two of the water.

Compliance with these simple hygienic measures will give assurance that the ordinary number of cases will be reduced and the intensity of the disease diminished in time of epidemics.

RULES OF PERSONAL HYGIENE THAT SHOULD BE OBSERVED FOR THE PREVENTION OF CHOLERA.

Keep a cool head, do not become frightened, avoid disagreeable impressions, and take sufficient recreation. Commit no excesses, particularly sexual, which by weakening the system render one liable to contract the disease. Do not drink to excess, despite the belief which is prevalent that by the free use of liquors cholera can be avoided, as the truth is just the reverse, many having sacrificed their lives as a result of believing in this fallacy. Do not drink cold water nor partake of iced drinks, and all food taken should be simple and easily digested. All green vegetables should be cooked and fruits be perfectly ripe or pickled, and wines partaken of sparingly. An abdominal flannel bandage should be worn. Avoid catching cold, and one should not expose himself freely to the morning or evening air. Breathe pure and dry air, avoiding badly ventilated and overcrowded rooms. No medicines should be administered excepting such as are prescribed by a doctor, as the various preparations put up and sold as cholera cures are worthless. Only such preparations as are approved by the Royal Medical Academy are of value.

MEASURES TO BE TAKEN WITH A PATIENT.

The moment the slightest indisposition is felt, particularly in the abdomen, a doctor should be summoned, as, if taken in time and treatment undertaken at once, the majority of the cases can be saved. No matter how grave, the case should never be abandoned, as many who were practically dead have been known to recover.

Before the arrival of the doctor, in order not to lose precious time, one should proceed in the following manner: Place the patient on a warm bed in a well-ventilated room. Give no food, and if symptoms of colic are presented give an injection of warm water, with or without oil, as well as oil by the mouth. Surround the patient with warm water bottles or small sacks of warm sand. If possible, give a vapor bath. If a patient complains of thirst give ad libitum warm camomile tea, to which has been added a little rum or cognac, and a few drops of laudanum. If there is vomiting, give frequent small doses of some sedative. As soon as diarrhea appears give an injection consisting of half a glass of warm water to which is added 1 tablespoonful of starch and 16 drops of laudanum. These measures should be followed pending the arrival of the doctor, but when he arrives he will assume full charge of the case. No others than those in attendance should be allowed to enter the sick room. If the patient is not so situated that he can be advantageously treated at home, he should be immediately transferred to a hospital for such cases. The vehicle in which such patients are transferred should be disinfected daily with sulphur fumes and later with carbolic acid solution. The doctor shall immediately notify the authorities of any cases of cholera or of any suspected cases.

All cadavers shall be taken at once to the morgue, and after twenty-four hours (never before the expiration of that time) be carefully buried in lime in a deep grave.

The name "disinfectant" is given to certain agents which have the power of destroying infection. The use of disinfectants is very old, they having been employed since remote times in connection with the terrible pestilence which formerly made such ravages as to decimate, if not wholly destroy, entire cities. To many drugs has been attributed the power as antiseptics, though most of the older ones have completely dropped out of use. Some, however, notably sulphur, still remain. Of the more effective disinfectants the following are recommended in the order in which they are given, having in mind the ease with which they can be procured, the readiness with which they can be applied, and the cost.

Formerly, and even to the present day, many people believe that a bad odor constitutes the only element of danger, and where no odor no danger exists. As a result of this belief the idea of using aromatics was formed and the name of deodorants given. Disinfectants destroy the germs, while deodorants merely do away with the bad odor without killing any of the microbes.

Physical or chemical agents may be used as disinfectants. Among the first are included ventilation, heat, and running water. Ventilation, either natural or artificial, purifies the air in houses, hospitals, prisons, etc. Heat is the most powerful of all disinfectants, it being an old method in infected pueblos as a means not only of purifying the air but of increasing the air currents, serving at the same time to destroy all clothing which has been used by cholera patients, as by further using them the disease would spread.

APPLICATION OF CHEMICAL AGENTS AS DISINFECTANTS.

Disinfection of houses: Supposing they are occupied, disinfection will be done as a precaution as follows:

To 42 grams of water are to be added 64 grams of nitric acid and 64 grams of powdered niter, this to be placed in a vessel over a fire in the center of the room and stirred slowly with a glass rod or with a clean stick to favor evaporation. This formula has the advantage of not molesting the occupants of the house, and is capable of disinfecting about 120 cubic meters. Aside from the above, place four plates in the corners of the room, these plates to be filled with 100 grams chloride of lime, adding sufficient water to form a paste, this to be stirred once every three or four days. The former fumigation is to be made daily as long as there are any patients in the house. It is also well to place under the pillows and mattresses 100 grams of sawdust which has been sprinkled with a mixture composed of 5 grams of carbolic acid with a little alcohol.

If a case of death occurs in the house, the latter is to be fumigated in the following manner: On a fire in the middle of the room place a vessel containing 250 grams of sulphur moistened with alcohol 36%. Such gilded articles as looking glasses, picture frames, etc., may be removed from the room to prevent their being injured. The doors and windows are to be closed and no one should enter the house for twenty-four hours, at which time it should be well aired and later whitewashed and cleaned.

DISINFECTION OF CHOLERA DEJECTION, CLOTHES, ETC.

If there are any urinals or vessels containing vomited matter or fæces, 5 tablespoonfuls of the following mixture should be added: Iron sulphate and lime chloride, equal parts. Later throw the contents in the latrine, or better, dig a small hole and bury. If thrown in the sink, double the amount of the above mixture should be added to boiling water and this thrown in the pit. The clothing used by the patient, if old and worthless, should be destroyed by fire. Such articles as are to be preserved should be well packed in sawdust, to which carbolic acid has been added, and soon thereafter they should be boiled in water containing ashes. All who have been in contact with the patient should wash their hands in a 5 per cent solution of permanganate of potash. The formulas given (iron sulphate and lime and sulphur) should also be used in such stables, slaughterhouses, markets, etc., as are in bad condition.

In addition to these, the following formula should be employed to disinfect boats: Nitric acid, 180 grams, and pieces of copper to the same amount. Place the copper in a large glass or china vessel, add the acid, and after closing all hatchways, doors, etc., leave the place. Neither copper in powder nor in filings should be used, as the reaction is very rapid and injury may result to the operator. If the above-mentioned materials can not be obtained, the following may be used: Equal parts of common salt and sulphuric acid, mixed in a glass vessel and placed in the room to be disinfected, taking the precautions stated above.

These instructions, issued in 1888, will account for the present prevailing opinion among the natives and Spaniards throughout the Philippines that cholera is an air-borne disease, an opinion as dangerous as it is incorrect.

Pampanga.—Cholera appeared in San Simon, in this province, April 6, at San Miguel on the 10th, and two days later it broke out in Macabebe, and by the 15th of the month it had reached Sexmoan, from which it rapidly spread to all the remaining pueblos. About the middle of July it began to decrease, so that by the 22d of the same month it only existed in the towns of Bacolor, Betis, San Fernando, and Arayat. It disappeared toward the end of September, 1902, after having caused a considerable number of cases and deaths. The town of Candaba registered 403 cases, with 186 deaths; San Miguel reached the highest rate of mortality, having 349 cases with 349 deaths.

Tarlac.—One case occurred in the town of Gerona on April 22, 1902, followed by another case on the 29th. These 2 cases occurred in the same house. After this date no more cases were registered, due to the strict measures which were adopted, the house where the cases occurred and the adjoining one having been burned.

On July 2, 1902, a new case developed in Camiling, followed by 3 more on the 8th of the same month. From this town it was propagated to the capital about the middle of the month. On the 29th the capital and the towns of Moncada and Camiling were officially declared infected with the disease. Toward the beginning of August it appeared in Victoria, and during the last days of the same month in Santa Ignacia, Paniqui, Murcia, Capas, and Concepcion. Thence it rapidly increased in its activity, reaching the maximum on August 31, after which date it began to decrease until it had entirely disappeared by November 28, 1902. Before the appearance of cholera in this province, and as soon as it was officially declared in Manila, strict precautionary measures were taken in the capital and the other towns of the province. Sanitary cordons were established in the limits of the same; a thorough cleansing of houses and streets was ordered; the use of raw foods and fruits which were considered dangerous to health was prohibited, and a corps of sanitary inspectors were organized to see that these orders were complied with properly. But in spite of all, the disease found some means of introducing itself

and spreading through the whole province. In Victoria a mortality of 4 per cent of the entire population was registered, and 3 per cent in the capital.

Pangasinan.—On April 20, 1902, an isolated case was registered in Lingayen, and on May 20 some cases developed in San Carlos, from which the epidemic spread to the other towns of the province.

The propagation was very rapid, appearing in some instances in two towns on the same day. This was probably due to the carelessness of the inhabitants in complying with the sanitary measures which were advised.

According to the report of the president of the provincial board of health for the province, the towns which suffered most severely were Dagupan, 1,664 cases; San Carlos, 1,150 cases; Mangaldan, 1,033 cases, and Calasiao, 1,018 cases.

Batangas.—Cholera appeared in this province, in the town of Lipa, on May 20, 1902, and in Tanauan on the 28th of the same month. According to Doctor Woodruff, the first cases had such a short period of incubation that it could be safely stated that they were already sick when they arrived in the town. It was observed in the town of Balayan that the majority of the cases occurred in the barrios that were supplied with water from a river which was infected, but that in others, where the water was obtained from fountains, the cases were very rare. This is one of the provinces in which occurred a large number of cases and deaths.

La Laguna.—The epidemic first appeared in the town of Biñan on May 23, where there occurred during the first ten days 106 cases, with 80 deaths. From this town it spread to the other towns of the province, and finally disappeared in the early part of October, 1902.

On the 25th of May, 1903, a sporadic case was registered in the capital, but toward the 20th of June several other cases developed, the maximum being 8 cases, with 5 deaths. From the capital it was propagated to the towns of Pagsanjan, Lumbang, Paete, and Luisiana, but it did not reach any other towns. In the latter town it was confined to one street, where the people supplied themselves with water from an infected well, and as soon as this well was closed the disease disappeared.

Union.—On July 6, 1902, cholera appeared in Santo Tomas and Agno, and from these towns it was propagated to the other towns of the province. Toward the latter part of September, 1902, it had considerably decreased and existed only in Bacnotan, Bauan, and Bangar where the last cases were registered on October 17. Several houses and a number of bodies were burned during the month of August. During the epidemic very rigorous prophylactic measures were adopted in the capital, where the disease was practically suppressed. The towns in which the disease made the greatest ravages were Bauan, Aringay, and Santo Tomas.

Ilocos Sur.—The epidemic started in San Esteban on July 9, 1902, and, in spite of the measures of precaution and rigorous quarantine in which the town was placed, the same spread through the whole province and did not disappear until the beginning of November, 1902.

Sorsogon.—Cholera appeared in this province on July 25, 1902, and developed with great intensity in the town of Sorsogon, where, on November 19, 1902, 18 cases with 12 deaths were registered.

It disappeared during the latter part of December, with a record of 713 cases and 342 deaths. It again reappeared in Bulan during the first days of January, 1903, and during the month 158 cases and 87 deaths were registered. In February it decreased considerably, and during the month of March only 8 cases and 7 deaths were registered.

Ilocos Norte.—The first case was registered in this province in Pacay on July 24, 1902, and from there it spread to Bacarat, Laoag and other towns of the province. The disease rapidly developed in Bactac, where in less than one month there were 543 cases and 335 deaths. In spite of all the quarantine measures, by the month of August the whole province had become infected, 4,179 cases and 2,946 deaths being registered. By the 1st day of September it had almost disappeared and was only existing in Parruquin and in a barrio of Bangui, where it was brought from the Cagayan Valley.

According to the data furnished by the president of the board of health, the maximum of cases was registered in Laoag on August 12, 1902, there being 51 cases and 48 deaths. During the month of August there was a general decrease in all the towns, with the exception of Dingras, but it did not completely disappear from the province until the middle of December, 1902.

Bohol.—An isolated case was first registered on March 29, 1902. After this the disease again appeared on July 29, 1902, on which date a case occurred in a banca that came from Cebu; thereupon the epidemic spread from north to south of the island, developing steadily until June 20, 1903, when it began to decrease. More than 6,000 cases occurred during the epidemic, most of them being registered in the towns of Valencia, Panglao, Tubigan, Inabanga, Laoay, Bilar, Loon, Ipil, Jagna, and Tagbilaran.

Albay.—Cholera made its first appearance in this province in the town of Guinobatan, and it is supposed that it was carried to this town by some transients who went there to attend a fiesta on August 15, 1902. From this place it spread to the other towns of the province. The disease was of a mild character and disappeared in a very short time from the towns of Libong and Polangui, to again appear in Ligao, Guinobatan, and Camalig. About the middle of September it was reported that it had entirely disappeared from the whole province, although it is believed that it still continued in Oas, notwithstanding the fact that this statement is denied by the inhabitants of that town. It again appeared in Ligao on January 1, 1903, with an average of 2 cases per day. The measures adopted in this province were not very rigorous, this course being deemed advisable by the president of the board of health on account of the special conditions of the province.

Benguet.—The first cases were registered during the month of August, but they were very few until the month of September. It disappeared during the month of October and again appeared in Dish-Dish on November 20, 1902.

Negros Occidental.—For a long time before the cholera appeared in this province rigorous measures had been adopted for the purpose of avoiding the introduction of the disease. On August 18, 1902, a case occurred in Punta Tumungtung, a barrio situated on the seashore, where vessels seek anchorage in bad weather. That same day the board of health of the province held a special meeting and

adopted measures to fight the disease. But in spite of all these measures, which were rigorously carried out to impede the spread of the disease, a person coming from Saravia, a place which was then infected, died in Bacolod on August 24, 1902. During the first part of September the disease was present in the towns of Bacolod, Talisay, Silay, Saravia, Eustaquio Lopez, Victoria, and Manapla. This province is, after Iloilo, the second in the number of cases registered.

The towns which suffered most from the disease are: Ginigaran, Bacolod, Pontevedra, Silay, La Carlota, Talisay, Valladolid, San Enrique, Bianalbagan, Gimamanlay, and Ilog.

Iloilo.—On August 24, 1902, the first case of Asiatic cholera was found in a small boat that had come from Masbate. The province was already prepared for the epidemic, and several cholera hospitals had been built throughout the province. On the 28th of the month the existence of the disease in Iloilo was officially declared, and on the 29th it appeared in La Paz. In the beginning of October it began to decrease in several towns, and during the month of November and the first days of December there were but few cases registered, and it completely disappeared on December 22. Before the appearance of the disease full instructions had been published, a corps of sanitary inspectors had been organized in several municipalities, and quarantine had been established in the towns situated along the seashore. In several of the municipalities temporary hospitals had been built and provided with a force of practicantes and nurses. Notwithstanding all these precautions, the epidemic in this province caused a larger number of cases and deaths than in any other province. The towns which gave the highest figures were: Cabatuan, 3,203 cases, with 1,643 deaths, and Pototan 2,181 cases, with 1,990 deaths.

After disappearing during the last days of September, it again reappeared on May 5, 1903. This caused the reestablishment of the sanitary measures which had been abandoned. It again disappeared a little later and reappeared for a second time on July 18, 1903. The new infection was thought to be traceable to a parao that came from Bohol.

Capiz.—The epidemic began in this province on September 8, having been brought by a small fishing boat from Estancia, in Iloilo Province. This boat landed a sick man at Lebas, the port of Capiz city, and sailed away without being identified. From this case the infection gradually spread to every pueblo in the province. A medical inspector was sent from Manila with medicines and disinfectants. The people of Capiz, the capital city, built a cholera hospital and met the situation in other respects in a manner that would have reflected credit on any city of equal size in the United States.

Cagayan de Misamis.—Cholera appeared in this province during the latter part of September, 1902, and had reached Cagayan by the 1st of October. From this town it spread throughout the whole province. On December 26 the *Trenton*, a United States transport which had come from Iligan, which was then an infected town, was wrecked near the port of Oroquieta. The officers and crew were given temporary quarters in a camarin (warehouse), where all the useful articles which had been saved from the boat were also taken, as well as a good quantity of rations, consisting mostly of canned

goods. On the next day a suspicious case was found in the neighborhood of the camarin, and on the following day another case, which was diagnosed as cholera, was found in the same street near the first case. The disease did not spread, although it continued in a mild form in the town.

Surigao.—Cholera invaded this province, but caused very few deaths, and afterwards gradually disappeared, to reappear again on November 17, 1902. It was observed in this province that in the towns which were supplied with medicines and disinfectants there were very few deaths, while in those in which the epidemic had become severe it rapidly decreased as soon as medicines and disinfectants were sent.

Romblon.—Cholera started in this province in the town of Banton in September, 1902, and disappeared by the end of October, without causing great mortality or spreading to other towns. It reappeared on February 24, 1903, in Odiongan, and on March 2, 1903, in Despujol, but disappeared again on May 26, 1903. During the month of June the epidemic again appeared on the island of Tablas.

Paragua.—On October 13, 1902, the steamer *Nuestra Señora del Carmen*, coming from San José de Buenavista, touched at Calandacan, and on the same day one of the passengers who had landed died of cholera, which was thus introduced into the town. The disease was carried to the capital, Puerta Princesa, by the steamer *Fannie*.

Masbate.—Before the appearance of cholera in this province the necessary measures of precaution had been established, but during the month of October a parao succeeded in violating the quarantine regulations and brought the disease to the town of Milagros. On the 28th of the same month the first case was registered in the capital, and from there it began to spread, notwithstanding the quarantine, to which both the patient and the infected house were submitted. From the capital it spread to the town of Palanas, and afterwards to the towns of Mobo, Baleno, and Magdalena, causing a large mortality in these three towns. About the beginning of May, 1903, it appeared in the towns of San Pascual, Claveria, Aroroy, San Jacinto, San Fernando, and Uson, being spread principally by paraos.

Isabela de Basilan.—The epidemic first started in this province in the town of Calamaran on November 7, 1902, and spread to Nipa, a barrio composed of 20 houses, where it caused 10 deaths in a week. Its introduction was ascribed to the arrival of a vinta which came from Negros Occidental. It disappeared on December 21, after having spread to the other side of Isabela.

The epidemic has also developed in other provinces of the archipelago, but accurate notes have not been obtained of its march and progress.

Below is given a table showing the number of cases and the case mortality for each province:

Epidemic of cholera in the provinces of the Philippines Islands, from March 20, 1902, to August 31, 1904.

Provinces.	Cases.	Deaths.	Provinces.	Cases.	Deaths.
Abra	88	47	Misamis	4,621	2,477
Albay	1,142	1,049	Masbate	497	291
Antique	2,485	1,798	Negros Occidental	8,564	2,553
Bataan	1,267	917	Negros Oriental	1,136	861
Batangas	3,433	2,718	Nueva Ecija	1,905	1,514
Benguet	1	1	Nueva Vizcaya	1	1
Bohol	2,706	1,877	Pampanga	1,209	860
Bulacan	1,823	1,363	Panay	69	39
Cagayan	980	672	Pangasinan	7,771	5,478
Camarines (Ambos)	1,403	1,045	Rizal	1,260	757
Capiz	4,650	3,016	Rizal (Fort Wm. McKinley)	3	3
Cavite	876	634	Romblon	200	74
Cebu	14,210	9,983	Samar	1,391	1,345
Ilocos Norte	1,694	1,228	Sorsogon	542	255
Ilocos Sur	1,584	1,067	Surigao	1,022	749
Iloilo	26,427	19,095	Tarlac	986	718
Isabela	82	43	Tayabas	376	246
Jolo	26	21	Union	3,874	2,883
La Laguna	2,981	2,399	Zambales	2,161	1,412
Leyte	1,445	1,098	Zamboanga	273	136
Marinduque	608	532	Miscellaneous	52,522	31,505
Mindanao	69	36			
Mindoro	308	279	Total	160,671	105,075

The following table gives the number of cases by months and years:

Epidemic of cholera in the city of Manila and provinces from March 20, 1902, to August 31, 1904.

Date.	Manila.		Provinces.	
	Cases.	Deaths.	Cases.	Deaths.
1902.				
March	108	90		
April	586	406	1,927	1,417
May	550	442	2,407	1,631
June	601	492	5,204	4,097
July	1,368	1,053	7,757	5,807
August	720	581	11,247	7,874
September	273	179	43,346	27,410
October	87	57	30,837	18,572
November	336	236	12,353	6,681
December	35	24	5,918	3,583
1903.				
January	7	4	4,921	2,757
February	2	1	2,907	2,009
March	6	6	1,903	1,124
April	33	27	1,772	1,147
May	230	212	1,402	885
June	39	38	3,554	2,945
July	42	38	4,167	2,806
August	89	72	10,212	7,406
September	290	263	4,613	3,672
October	127	118	2,531	1,969
November	31	26	1,119	937
December	14	13	364	270
1904.				
January	4	5	35	24
February	3	3	61	42
March			23	10
April			1	
Total	5,581	4,386	160,671	105,075

Last case of cholera occurred in April, 1904.

CHOLERA IN THE ARMY.

The mean strength of the army in the Philippines from April, 1902, to December, 1903, was 26,915. The number of cases was 586 with

386 deaths. Three hundred and five deaths were those of American soldiers and 81 were Philippine scouts.

PHILIPPINES DECLARED FREE FROM CHOLERA.

The board of health, on the 27th of April, 1904, after careful consideration, declared by resolution that:

Whereas cases of Asiatic cholera have occurred in but three provincial towns of the Philippine Islands since February 8, 1904; and

Whereas only one case of Asiatic cholera has been reported as occurring at any place in the Philippine Islands since March 8, 1904; and

Whereas the city of Manila was declared on March 23 to be free from the infection of Asiatic cholera: On motion

Resolved, That the islands composing the Philippine Archipelago are, and are hereby declared to be, free from the infection of Asiatic cholera; and

Be it further resolved, That the commissioner of public health be directed to send a copy of the these resolutions to the honorable the secretary of the interior, the municipal board, the United States Marine-Hospital Service, and the collector of customs.

Thus ended the cholera epidemic of 1902 in the Philippine Islands. While its disastrous effects will be felt for many years to come, it is not without its valuable lessons, from which, it is hoped, much has been learned.

ORGANIZATION.

The bureau of public health is now organized into eleven divisions, each division being under an officer who has proved himself quailfied for the position he occupies: (1) Division of statistics and reports, including medico-legal matters; (2) division of inspection, including transportation and municipal pharmacies; (3) leper colony division; (4) division of hospitals, including leper hospital, venereal hospital, plague hospital, smallpox hospital, and cholera hospital; (5) division of vaccination; (6) veterinary division; (7) division of sanitary engineering; (8) division of disbursements; (9) division of property accountability; (10) clerical division; (11) division of provincial sanitation.

The chief of each division is held accountable for the working and results of his division. It is believed that much labor and time are saved by this organization.

SANITARY INSPECTIONS.

This work was seriously interrupted by the reduction of force and change of system, but, as will be seen from the report of the chief health inspector, it has been organized upon a new basis. Notwithstanding the interruption, there have been made in the city of Manila 408,318 inspections and reinspections of houses; 49,511 houses were cleaned as a resuult of sanitary inspections; 235 houses were whitewashed and painted; 3,076 were disintected; 115 houses were condemned and removed; 2,199 cesspools were cleaned; 19,079 yards were cleaned; 300 yards were repaired or repaved; 82 cholera cases, 70 smallpox, and 95 plague cases were reported; 3,267 sanitary orders were complied with by householders. Forty-two convictions were secured for failure to comply with sanitary orders.

The people in Manila, as elsewhere, object to domiciliary visitation. The board of health has placed rigid restrictions upon its inspectors, and under the present system, very little complaint is heard. The time has not come when the practice may be dispensed with entirely.

DIVISION OF SANITARY ENGINEERING.

The position of sanitary engineer for the city of Manila has been abolished by legislative action of the Commission and the work of this division transferred to the sanitary engineer for the Philippine Islands. Attention is respectfully invited to his report, herewith submitted.

SPECIAL SANITARY INSPECTIONS OF PROVINCES.

During the year a number of medical inspectors have been detailed on provincial duty for the purpose of examining into and reporting upon sanitary conditions, including the measures employed to combat epidemics affecting human beings or the lower animals and the recording of vital statistics. The reports of these officers are submitted among the special reports hereto appended.

These inspections, when made carefully and tactfully, are productive of great benefit to the service. They bring about a better understanding with reference to what is required by the insular board of health. It is the purpose of the bureau to extend them so as to include every municipality in the Philippine Islands.

GENERAL SANITATION IN THE PROVINCES.

In the work of organization and administration of provincial health work, as contemplated by Acts Nos. 307 and 308, providing for the establishment of provincial and municipal boards of health, this office has been embarrassed by the lack of properly qualified persons to fill the positions of presidents of municipal boards of health. The law prescribes that a president of a municipal board of health shall be a duly qualified physician or undergraduate of medicine, the latter, under the law, being one who has studied medicine for a period of not less than two years at the Santo Tomas University in the city of Manila and has received the title of "cirujano ministrante" from said university. It frequently happens that in towns of considerable size no person with the necessary qualifications can be found. This lack of medical men is undoubtedly an important factor in the responsibility for the high death rate that may be noted in these towns. Many lives are sacrificed annually for want of intelligent medical treatment. This is as true of the city of Manila as it is of the provinces, and should not be construed as meaning that there is a demand for American physicians in the Philippines. The trouble lies with the people themselves, who, in the provinces especially, still cling to their superstitious ideas. They are entirely ignorant of the simplest rules of hygiene or the cause or nature of disease. When they are sick they resort to certain native remedies of doubtful value. These remedies are administered by "mediquillos," who are as far down in the "professional" scale as it is possible to descend. The medical efforts of the "mediquillos" are reinforced by various other things which the Filipino mind is slow to discard.

Without education it is very difficult to impress upon them the importance of hygiene and intelligent medical treatment. They have been long accustomed to looking upon disease as a retribution for sin and are not eager to believe in the gospel of sanitation. The solution

of the problem must be worked out with the coming generations, and will depend as much upon the school-teacher as upon the sanitarian.

Another difficulty that has interfered with the efficiency of the sanitary organization is the lack of transportation facilities. The difficulties in this respect are great at all times, especially during the season of rains. In many districts there are practically no roads and the only means of communication is by horse or on foot. The bureau of engineering is now engaged in building roads and bridges, and within a few years these difficulties may be overcome. The "baguios" make sea transportation on opposite sides of the archipelago difficult and sometimes dangerous during the alternate half years. Railroad transportation is limited to a single line, which runs from Manila to Dagupan. The board of health will welcome the "era of railroad building" which has been predicted by the local press.

The municipalities throughout the provinces are generally poor, and expensive sanitary improvements at present are out of the question. The people are rather inclined to let alone what they consider well enough, or, in other words, they are prone to follow the lines of least resistance.

The cause of sanitation has much to hope for from the public school system under its able administration, and in the course of time many difficulties which now impede the progress of sanitary science will be removed.

The central sanitary organization of the board of health for the Philippine Islands is represented in the provinces by provincial boards of health, composed of a president, who must be a graduate physician registered under Act No. 310, regulating the practice of medicine and surgery in the Philippine Islands, the president of the municipal board of health of the capital of the province, and the provincial supervisor. The secretary of the provincial board acts as secretary, and the provincial fiscal as legal adviser of the board. Provincial boards of health are represented in the various municipalities by municipal boards of health, composed of a president, who is required by law to be a duly qualified physician or undergraduate in medicine, a member chosen by the municipal council, a male school-teacher of the municipality, appointed by the division superintendent of public instruction for the division in which the municipality is situated, and the municipal secretary, ex officio. The senior medical officer of the Army or Navy, if there be any such on duty in the municipality, and a resident pharmacist are honorary members of the municipal boards of health, but have no vote. It will be seen that the insular board of health, through these organizations, is brought in touch with the sanitary condition of even the most remote municipalities. Taking advantage of the opportunity offered by this system of organization, and acting upon the suggestion of the chief health inspector, Captain Munson, who was at that time acting commissioner of public health, organized, in the month of November, 1903, a school of instruction for presidents of provincial boards of health, and, through the agency of this school, introduced the sanitary methods of Manila in most of the provincial capitals and in many municipalities throughout the provinces. The general plan and scope of this course of instruction, which lasted several months, the classes being limited to a few members for convenience of teaching, are given in the following circular:

To all presidents of provincial boards of health:

I. With the approval of the honorable the acting secretary of the interior it is the purpose to order every president of a provincial board of health, within the next twelve months, to temporary duty in Manila.

II. This tour of duty is for the purpose of familiarizing them with the character of work carried on by the different divisions under the bureau of public health in Manila, so that, on returning to their provinces, they may be able to conduct their sanitary work along the same general lines and under a common method of procedure.

III. The general scheme of duty, as now projected, is intended to cover four weeks, will be wholly practical, and is divided as follows:

1. Six days as assistant district medical inspector.
(*a*) Observing the general work of a sanitary station.
(*b*) The methods of sanitary, house, and food inspection.
(*c*) Disinfection.
(*d*) Plague inoculation.
(*e*) Treatment of plague and cholera houses.
(*f*) Service of sanitary orders.
(*g*) Diagnosis and removal of infectious cases.
(*h*) Rat destruction in prevention of plague.

2. Two days accompanying the inspectors of plumbing and officials of the pail conservancy system, to observe methods and appliances in use for the sanitary reception and disposal of excreta.

3. Three days' instruction in port quarantine and method of ship disinfection under the chief quarantine officer.

4. Two days' instruction by the veterinary surgeon in clinical and post-mortem diagnosis of epidemic diseases of domestic live stock and examination of live stock and meat at abattoir.

5. Two days at the serum laboratory observing the methods of preparing serums and vaccine virus; also of inoculating against rinderpest and the use of fungus against locusts.

6. One day with the vaccinators in Manila observing methods of vaccination, records, etc.

7. Six days as assistant physician at San Lazaro hospitals observing the management and equipment of the plague, cholera, smallpox, leper, women's, morgue, crematory, and steam disinfecting departments, the treatment of the sick, and the method of making post-mortem examinations and disposal of the dead.

8. Two days in the office of the secretary of the board of health as his assistant to observe the keeping of records, calculation of vital statistics, and preparation and the use of reports; also to be present at meetings of the board of health for the Philippine Islands to note methods of procedure, etc.

IV. Presidents of provincial boards of health will be expected to profit as far as possible by the opportunities afforded under this plan for perfecting themselves in their special duties as sanitary officers.

Such notes and memoranda relating to the work of the different divisions of the board of health as may be required will be made while on duty in Manila by presidents of provincial boards of health, who may be called upon to render a report based on these notes at the conclusion of their tour of duty, to show the degree of professional benefit derived therefrom.

V. Reports will be rendered upon the industry, zeal, and aptitude of each president of a provincial board of health under whom they may be assigned for the purpose of acquaintance with the work and methods of such divisions, and these reports will be filed in the office of the board of health as part of the efficiency record of each president of a provincial board of health and consulted with respect to the fitness of such officials for future promotion.

VI. The hours of duty will ordinarily be from 8 to 12 a. m. and from 2 to 5.30 p. m. daily, except Sundays.

VII. As far as practicable, two or three presidents of provincial boards of health will be given the benefits of service in Manila at the same time, in connection with the above scheme of instruction, so that in the course of a year all may have enjoyed these opportunities.

VIII. Details for the above purpose will be made only after consulting with the presidents of provincial boards of health, so that they may have ample opportunity to make proper arrangements for the transaction of public and private business during their absence in Manila.

IX. Reimbursement for expenses necessarily and actually incurred for travel from their proper stations to Manila and return, under proper orders, will be made to presidents of provincial boards of health from the funds of the board of health for the Philippine Islands. From and including the date on which each president of a provincial board of health reports

much valuable equipment. The fact that the temporary character of the system is generally recognized may have kept this valuable branch of the public service from receiving the attention and support which its usefulness merited. The work was placed under the city engineer last February, and will soon be operated under ordinance regulations drafted by the board of health, as provided for in Act No. 1150 of the Philippine Commission.

DIVISION OF DISINFECTORS.

A division of disinfectors, under a chief disinfector, has been organized and placed under the direction of the chief health inspector. To the equipment of this important division has been recently added seven Kny-Scheerer Company's No. 2 improved formaldehyde generators with automatic pressure regulators and diaphragm valves. The generators are used for applying a formaldehyde solution made by thoroughly dissolving 200 parts of chloride of lime in 400 parts of water, filtering the solution, and adding 1,000 parts of a 40 per cent strength formaldehyde.

The automatic pressure regulating diaphragm makes it possible to admit a continuous stream of pure formaldehyde gas into the room to be disinfected. This gas has a powerful germicidal influence, and is one of the most satisfactory and efficient agents for disinfecting rooms that can be tightly closed.

HABITATIONS.

The houses of Manila may be divided into three general classes and designated as Filipino houses, Spanish houses, and modern houses.

The Filipino house.—Filipino houses are generally elevated on bamboo posts several feet above the ground, and have floors of bamboo slats, roofs of nipa thatch, and walls of nipa or of "sawale" wickerwork. The houses are cool, dry, and well ventilated, and when located on healthful sites, provided with adequate facilities for the disposal of excreta, and kept in a cleanly condition they are very suitable habitations for this climate, but unfortunately the requirements as to sanitation are not usually considered. One great objection to this class of buildings is their inflammable character, which, when the houses are close together, renders it very difficult to control fire, especially during the dry season, if the wind is blowing. In the fire which occurred in the Santa Cruz district in May, 1903, over 15,000 people were deprived of their homes in less than two hours.

The Spanish house.—This class of houses is the type that was built of heavy masonry by the Spaniards several years ago to afford security against the attacks of their enemies and to withstand the ravages of time and the danger from fires and earthquakes. In their construction the question of sanitation evidently was not considered. These houses, especially the lower parts, are usually dark and poorly ventilated, without proper sanitary conveniences, and are favorable breeding places for beetles, rats, mice, and other vermin. Chinese and the lower class of Filipinos usually occupy these houses. On account of their massive and faulty structure, and their proximity to other buildings, it is often impracticable to correct their sanitary

defects by any reasonable expenditure. The records of this bureau show that this class of habitations supplies the greater number of plague cases. This is probably true of tuberculosis and other diseases influenced by the conditions common to such houses.

Suitable ordinances have been prepared to regulate this class of buildings in the way of giving them more light and air and securing greater sanitary conveniences. The Chinese of Manila display their racial energy and ingenuity in many ways, but nowhere more persistently and thoroughly than in their efforts to shut out from their habitations all semblances of fresh air and sunshine.

Modern houses.—These are generally built of wood, surrounded by porches, and are provided with an abundance of fresh air and sunlight, which render them sanitary and inviting. Such houses, as would be expected, are usually provided with proper sanitary conveniences and are maintained in a cleanly condition.

OVERCROWDING.

There are two important factors to be considered in this insanitary condition, so common in the city of Manila. The first is the crowded condition of the buildings with reference to their location, which in part is due to the fact that the city was started wrong, and it has remained wrong ever since, but in the Nipa districts it is due more especially to the fact that the poor people have to rent the ground from the landowners at so much a square meter. The landowner causes the houses to be erected as closely together as possible in order to increase his income.

The second and most important is the prevailing high rents, which are almost prohibitive. At present very little can be done to relieve the situation. The completion of the electric street-car line will probably bring about some improvement. It is hoped that it will attract those who are able to pay car fare to the suburbs, where they can find more comfortable and more economical houses.

The city engineer will be justified, as soon as conditions will permit, in removing the more insanitary houses in the congested districts. Overcrowding is not so fraught with danger in the Filipino houses as it is in those of Spanish construction. Chinese prefer this condition, whether from sociability, economy, or other cause, it is impossible to state. A system of tenement houses affording cheap rents would be one way of overcoming the trouble. The proposed sanitary code clearly defines what is meant by overcrowding, and provides a penalty for violating the section relating thereto, but it will be difficult to enforce such an ordinance until other conditions necessary thereto are brought about. Because of the prevailing high rents, the poorer classes of Filipinos are practically forced to live under conditions that are extremely demoralizing and unhealthful.

The Chinese population will not be affected by tenement houses, street-car, or other facilities, or anything else except strictly-enforced sanitary ordinances. The use of mezzanine floors or of cubicles as sleeping rooms are conducive to disease and should not be permitted.

RIVER AND HARBOR POPULATION.

It is estimated that about 15,000 people live upon cascoes, lorchas, lunches, and other vessels that ply the Pasig River, esteros, and bay

along the water front. These people make their permanent homes on the boats upon which they are employed. Here they live, rear their children, grow old, and die, many of them on account of their insanitary habits, especially with reference to drinking impure water, long before their physiological time.

They do not realize the importance of supplying themselves with pure water, which at least would save many lives. This mode of life augmented the number of cases of cholera which occurred in Manila. The problem is a difficult one to regulate. The boat dwellers are usually of the least intelligent class. They prefer to throw their dead overboard rather than run the risk of a visit from the board of health disinfector. The board of health should be provided with a launch, so that daily inspections could be made of these water craft. The services of the police launch are needed for other purposes, which render it impossible to use it for sanitary inspections. A small, well-built launch that can go under the bridges and up the esteros is urgently needed. The problems presented by this subject are not easy to solve. An important step along this line would be the erection of public latrines on shore, convenient to fixed places of moorage, and to require their use. These regulations would doubtless be broken by night, but if they could be enforced even in part it would be a great improvement.

Another still more important step would be to pipe the city water supply to numerous places on the river front where it would be easily accessible.

MARKETS AND TIENDAS.

The markets of Manila on the whole are very creditable institutions. During the year a new one has been opened in the walled city. The small market in Sampaloc district should be remodeled or removed to a more favorable location.

The condition of the public markets reflects credit upon those responsible for their management. It is of the utmost importance that the city should provide suitable screens for keeping the food covered and rent or sell them to vendors. This is the only way in which uniformity and thoroughness in the matter of protecting food from contamination can be obtained. It will be more difficult to regulate the small tiendas or shops. There are about 1,200 such places in the city, and they are a great benefit to the people, especially the laboring class, a large number of whom take their meals in these places, while many others buy certain articles of cooked food there and take them to their homes to be served. It will be necessary for the city authorities to supply these places with a uniform food cover at a moderate price and make the use of the same compulsory. It will require time and tact to educate the people, especially the Chinese, to an appreciation of these sanitary precautions, but it is necessary that the work be commenced in the right way as soon as possible.

FOODS AND DRINKS.

The work of inspecting the articles of food and drink offered for sale in the various markets and tiendas has not been carried on so thoroughly as during the prevalence of cholera. These inspections are regarded as very important, but the sanitary force has been so greatly

reduced that it is impossible to give the subject the attention that its importance requires.

It is the custom of the lower class of the Filipino people to handle and inspect critically all articles of food that may be within their reach when they visit a tienda or a market stall. What is not bought is left to be handled by some one else, and by the time it reaches the table it has been exposed to infection from many persons. Cholera has been undoubtedly transmitted in this way, notwithstanding the regulations of the board of health, which prohibited the handling of food with the hands and required the vendors to supply forks for the use of their customers. This regulation was enforced when a sanitary inspector was present, but as soon as he was gone the "costumbre del pais" would again assert itself.

During the prevalence of cholera the sale of about 40 articles of food was prohibited. These articles included practically all nonacid fruits that were to be eaten unpeeled without cooking, all salad vegetables, all mollusks, and a considerable number of mixed foods composed in part of prohibited articles. The proscription against these foods was removed as soon as possible on account of the hardships which it necessarily imposed upon the poorer class of people, who were forced to pay more for permissible foods.

The new sanitary code makes provision for regulating the management of dairies, bakeries, confectioneries, manufactories of aerated waters, and other places where articles of food and drink are offered for sale.

As soon as the new code is ready for distribution the board of health will make active efforts to see that its provisions are enforced. Ordinary supervision is not sufficient to prevent infringements of the ordinance regulating the bottled-water industry. The proposed new code does not permit so many alternatives as the old ordinance regulations, under which it was very difficult to accomplish the desired results.

The dairy question up to this time has not assumed much importance, but in the course of time it will undoubtedly develop into an important industry. The new code has provided for its sanitary regulation.

The sale of food and drink by itinerant street vendors is an insanitary practice which it is easier to condemn than to regulate. The personal habits and practices of these vendors are not conducive to health. Spoons and plates, after being used by a customer, are wiped and passed to the next. If the customer is a child even the precaution of wiping the spoon or other article used by the former customer is not considered necessary.

OFFENSIVE OCCUPATIONS.

In every country offensive trades and occupations are necessarily carried on, but it is also necessary for the safety of the public that certain stringent laws should be enacted to govern such occupations.

The present city ordinance, now in effect, prohibits the establishment of any business of a highly offensive or dangerous nature within the limits of the city, or the establishment of less dangerous and offensive businesses, within the district, of strong materials, and prescribes that such business shall be conducted in a sanitary manner so far as possible.

When the new sewer facilities are completed, the question of the disposal of wastes from breweries, tanneries, dyehouses, and other similar places, which now pollute the esteros, will be solved. In my report for last year I had the honor to suggest that a law be enacted prohibiting the future location of any establishment for the conduction of a more or less offensive trade at any point within the incorporated limits of the city of Manila, prescribing that establishments of this kind now in operation shall be removed within five years.

Inasmuch as a city ordinance, made by the municipal board of the city of Manila, could not regulate such businesses outside of the corporate limits, it would necessitate a law of the Commission to protect completely the city of Manila from such offensive and dangerous occupations.

OPIUM-SMOKING ESTABLISHMENTS.

There are approximately about 200 establishments in the city of Manila where opium smoking is carried on. They are naturally filthy and insanitary, due largely to the character and habits of their patrons. The present way of dealing with them is not satisfactory; there is no law regulating them, hence they are not required to take out licenses. The new sanitary code of Manila proposes to regulate the conduction of such places, and classes them as "opium divans." It would require a greatly increased police force to suppress this evil, and as long as there are Chinamen in the Philippine Islands there will be opium smokers and opium smoking. If opium divans are permitted to exist, the business can be forced out of laundries and tiendas into the divans, where it can be so supervised and controlled as to reduce to a minimum the resulting evil effects which are now apparently on the increase.

The board of health deplores the existence of such establishments; nevertheless, they exist, and because they do exist and will continue to exist it would seem to be wiser to recognize them for what they are than to ignore them for sentimental reasons.

The habitual use of opium is a curse that will eventually bring disaster to those who indulge in so dearly bought illusory pleasures. The Filipino people merit great praise for withstanding the temptations and keeping themselves from the vice of intemperance.

The report of the opium committee, which is now ready for the printer, contains much valuable statistical information upon the effects of this evil and upon the number of persons of different nationalities in these islands who use opium.

FREE DISPENSARIES.

Three free municipal dispensaries supply medicines to the poor of the city upon the prescriptions of the municipal physicians. Two of these dispensaries have been established since my last annual report, one in Paco and one in Tondo. The total number of prescriptions filled is as follows: Quiapo, 6,840; Paco, 1,972; Tondo, 2,848, a total of 11,660 prescriptions filled by the three dispensaries.

The poor people are gradually learning to appreciate the advantage of these institutions, as will be seen from the increase over last year, when the number of perscriptions filled was only 6,658.

The Chinese prefer the treatment of their own practicantes, who are as ignorant of the use of drugs as they are of the cause and nature of

disease. The influence of Dr. Tee Han Kee, a municipal physician, has done much to improve the attitude of the Chinese toward those measures which are intended for their benefit, and it is believed that in the course of time they will abandon their present erroneous ideas with reference to medicine and disease.

FREE CLINICS.

Bishop Brent, of the Prostestant Episcopal Church, maintains on Calle Magdalena, in the district of Trozo, a free clinic for the treatment of all classes of diseases. His work has been a revelation to the people of Manila and marks the beginning of a new era in the administration of charities. With unselfish, broad, unassuming men, such as Archbishop Harty, of the Roman Catholic Church, and Bishop Brent, of the Protestant Episcopal Church, as leaders of the great work of uplifting the Filipino people, there can be no doubt of the ultimate outcome. This bureau acknowledges its indebtedness to both of these gentlemen for their cooperation and active support.

Free clinics are held daily at each of the municipal pharmacies from 8 a. m. to 5 p. m., and also at each board of health station, for one hour each day, from 8 to 9 a. m.

HOSPITALS FOR THE INSANE.

In my last annual report I called especial attention to the inadequate facilities for handling the insane. While the outlook in this direction is not all that could be desired, it is much brighter than at any time since the American occupation. The Commission has secured a building at Lomboy for temporary quarters. The contract with the Hospicio de San José has been continued, and, through the kindness and personal interest of Archbishop Harty, the facilities of this well conducted and desirably located institution have been increased, thus permitting Bilibid and Parian police station to be relieved of this class of occupants to some extent. The insane of the United States Army are cared for by the first reserve hospital of this city, pending their shipment to the Government Insane Hospital at Washington City. The Chinese are usually returned to China. The conditions in the provinces are still unsatisfactory. Incomplete statistics show that there are 2,007 insane men and 1,683 insane women in the Philippine Islands, making a total of 3,690. The methods formerly in use in the provinces were as unsatisfactory as they were unscientific. If a patient was violent, he was usually taken to a vacant room or house, where his clothes were removed and he was chained securely, so that he could not do violence to himself or others. It was comparatively easy to care for them by this method, which is probably the reason for its adoption. The care of the insane, the feeble-minded, the orphans, and the aged is one of the most important problems which the board of health has under consideration.

GENERAL HOSPITAL.

Since my last report, in which I emphasized the need of a general hospital, there has been something accomplished in this direction. A committee has reported upon the design for a modern building, and

the insular architect has drawn the plans. It is to be located on the grounds on Calle Padre Faura, known as the "exposition grounds."

The secretary of the interior has approved these plans and they will soon go up to the Commission for final action. The plans provide for a magnificent hospital on the most modern lines, containing offices, operating rooms, extensive wards for men and for women, wards for the insane, detention wards, a medical school, morgue, quarters for nurses and employees, a residence for the superintendent, and kitchens and necessary outbuildings.

There will be four large amphitheaters for medical students' clinics, and provisions are made for the use of the X-rays and of the latest scientific aids to surgery and medicine.

An entire department will be set apart for a maternity hospital, with different wards, and another for the treatment of the general diseases of women. There will also be several large free wards.

The stables, kitchens, and other buildings will be most complete and modern. Altogether the plans provide for the finest modern hospital in the Orient.

SAN LAZARO HOSPITALS.

The old San Lazaro Hospital, with its different departments, and the new hospital for infectious diseases have been placed under one management and renamed the San Lazaro Hospitals.

The facilities for handling infectious diseases in Manila were greatly increased by the opening of the infectious disease department of San Lazaro Hospital last February. This new building is modern in every respect and replaces the former unsuitable buildings which were destroyed by fire in May, 1903. The opening of this new hospital marks an important era in the handling of infectious diseases in the Philippine Islands. There is probably not a more conveniently arranged hospital in the Orient, or one better adapted to the purpose for which it is intended. The plans of this building were made by Dr. H. B. Wilkinson, the physician in charge, and perfected by the insular architect, who deserves great credit for the satisfactory way in which the building was erected. Attention is invited to the appended report of the physician in charge.

SAN JUAN DE DIOS HOSPITAL.

This hospital is conducted by the Roman Catholic Church. The city of Manila has a contract with the management to care for a hundred poor patients daily. The poor people, through the beneficence of the municipal board, avail themselves of the services of this excellent institution, as shown by the fact that the free wards are filled to the limit. This hospital deserves great praise for its charitable work. Its doors have been open to all classes, even before the city entered into the present contract to pay for a limited number. The faithful physicians and kind-hearted Sisters of Charity have cared for the natives and strangers alike. The boisterous American "drunk" has been received with the same kindness as though he were a pay patient. Many Americans will remember in the years to come, the San Juan de Dios Hospital, when other recollections of their strenuous lives in Manila have faded from their memories.

LABORATORY WORK.

The laboratory work of this bureau is carried on in the several laboratories comprising the bureau of government laboratories, which, while a separate bureau, is presided over by a member of the board of health.

The new laboratory building with its modern equipment is a monument to the wisdom of the Commission in dealing with problems of oriental sanitation and to their appreciation of scientific research.

MUNICIPAL PHYSICIANS.

There are, in the city of Manila, eight physicians employed by the board of health, whose duty it is to render medical assistance to the poor of the city. More and more, the poor people are learning to appreciate the value of intelligent medical services. There is a considerable number who still view the disease as a manifestation of divine displeasure, and look upon it as a sacrilege to use other means than prayer, while others are pronounced fatalists and adhere to the "no importa" idea in its entirety. The board of health is making a special effort to overcome these false ideas and prejudices and to induce the people to avail themselves of the services of the municipal physicians, who are intelligent men, selected by competitive civil-service examinations. Already the favorable effect of this policy is being felt.

MIDWIVES.

The board of health employs one Spanish and seven Filipino midwives, whose duty it is to attend the confinement cases occurring among the indigent in the city of Manila. These midwives are supplied with antiseptic dressings for the umbilical cord, and with maternity bands, which are large enough to conserve the body heat, so essential to the well-being of the infant during the first days of its life.

A committee of native physicians, appointed by the commissioner of public health, prepared a pamphlet upon the care of infants, which, in addition to its publication in English and Spanish, has been translated into Tagalog, Visayan, and several other native dialects. One of the pamphlets has been placed in every house in the city of Manila, and each midwife has been supplied with a number of copies for special distribution. There is no doubt that improper feeding, and tetanic convulsions due to infection of the umbilical cord, are responsible for a large part of the present excessive infant mortality.

TRAINING SCHOOL FOR NURSES.

The bill providing for the establishment of a training school for nurses has not yet been acted upon by the Commission. This matter will probably be postponed until the erection of the general hospital. Educated and scientifically trained nurses would be of far greater service than the practicante or cirujano ministrante, who generally holds himself above the menial services of a nurse; consequently, this part of the work falls to the muchacho, who performs it, if it is done at all, with the characteristic indifference of his class.

ILLEGAL MEDICAL PRACTITIONERS.

Notwithstanding a carefully prepared law regulating the practice of medicine and surgery in the Philippine Islands, a number of pretenders essay to practice the profession of medicine. This is especially true of the Chinese, who are further behind in this respect than any other. These "practicantes" are grossly ignorant of even the simplest principles of disease and its treatment; the many means employed to bring about their so-called cures are absurd and ridiculous. They do a great deal of harm, but, as it is impossible to prove that they accept fees for their services, they can not be reached by the law. There is one highly educated, duly qualified Chinese physician in the city, Dr. Tee Han Kee, whose services have been of great value to the board of health. Dr. Tee Han Kee has been very zealous and outspoken in his condemnation of the ignorant and harmful customs that prevail among his people, and in consequence of this attitude he has been grossly misrepresented by the very ones whom he sought to benefit.

The illegal Filipino practitioners respect and fear the law, consequently the harm that they are able to do is reduced to a minimum. This class is almost certain, sooner or later, to fall into the meshes of the law.

THE BOARD OF MEDICAL EXAMINERS.

The practice of medicine and surgery in the Philippine Islands is regulated by Act No. 310. Physicians desiring to practice medicine must pass a satisfactory examination, the limits of which are prescribed by law. Graduation from a recognized medical college is required as a condition for admittance to the examination for a certificate to practice.

BOARD OF PHARMACEUTICAL EXAMINERS.

The board is charged with the administration of the law regulating the practice of pharmacy in the Philippine Islands. Applicants for certificates are required to pass a satisfactory examination.

BOARD OF DENTAL EXAMINERS.

The practice of dentistry is also regulated by an up-to-date law which requires a satisfactory examination.

LEGISLATION.

The principal legislation recommended by the board of health may be found in the proposed bill entitled "An act providing for the segregation, treatment, and care of lepers in the Philippine Islands" and in a proposed ordinance entitled "An ordinance relating to sanitation and providing for a sanitary code for the city of Manila."

The passage of the sanitary code will simplify and systematize the duties of the board of health in Manila, and will also serve as a guide to sanitary legislation in other municipalities.

SANITARY LAWS.

The courts of Manila and the city prosecuting attorney have been zealous in their enforcement of the laws and ordinances relating to

sanitation. Without this support it would not be possible to make effective any plan of sanitary improvement, as there are many who regard the penalty clause of sanitary ordinances as the only feature worthy of their consideration. Property owners as a class are entirely indifferent to sanitary necessities and comforts of their tenants. Whenever it has become necessary to summon offenders before the courts, the so-called better class have not escaped conviction through the power of wealth and influence. It is safe to say that there is no place or city in the world where the laws are more impartially administered than in Manila.

The present system of municipal courts in the provinces is unsatisfactory and uncertain. Municipal presidentes, whose duty it is to enforce sanitary ordinances, are more or less influenced by political obligations and political animosities and not infrequently permit their own friends to go free and punish their enemies too severely.

A general law, similar to Act No. 1150, is needed for the provinces, in order that the board of health may cause to be established, so far as practicable, a uniform system of sanitary ordinances which in time will become generally known and respected.

BILIBID PRISON.

On the 18th of August Bilibid prison contained 4,346 prisoners, classified as follows:

Nationality of prisoners.	Carcel.		Presidio.		Total.
	Males.	Females.	Males.	Females.	
Americans	71		43		114
Europeans	9		1		10
Natives	1,513	78	2,562	21	4,174
Chinese	46		2		48
Total	1,639	78	2,608	21	4,346

This institution has had a daily average of 3,735 convicts for the year, with 265 deaths.

The average rate of mortality among the prisoners in Bilibid prison for the fiscal year commencing July 1, 1903, and ending June 30, 1904, based on the number of prisoners confined and the number of those who died during each month of the said period, is as follows:

Date.	Monthly average per 1,000.	Date.	Monthly average per 1,000.
1903.		1904.	
July	27.79	January	57.59
August	88.80	February	67.66
September	58.93	March	51.97
October	78.52	April	75.06
November	82.37	May	80.29
December	83.82	June	70.48

The average annual death rate, computed from the figures given in the annual report of the prison, is 70.95 per 1,000.

The high death rate was discussed in detail in my report for last year, and the need of additional medical assistance and facilities was brought to the attention of the Commission.

Some time ago a committee was appointed by authority of the

Commission to visit and report upon suitable sites for auxiliary prisons in different parts of the archipelago. This is an important step, and if the plan is carried out it will guarantee to those inmates who are not legally condemned to death the one constitutional right left to them as prisoners—the right to live.

HEALTH OF AMERICAN CIVIL EMPLOYEES.

There has been said and written so much about the question of the health of the American employees of the civil government, and so little statistical information published, that this office decided to gather such information as was easily attainable.

The records of the civil-service board have not yet been made available for statistical purposes, and in order to make a beginning in the matter the commissioner of public health, under date of March 12, 1904, addressed the following communication to each bureau chief in the Philippine civil service:

SIR: I have the honor to request that you will, if convenient, furnish me with the total number of American employees in your office who have served in these islands for more than two years continuously, together with a statement of the total number of days' sickness of these employees for each of the first two and for any subsequent year of the service.

It is the intention of this office to prepare a statistical table, and the information asked of you is desired to complete that table.

The replies received in answer to this communication have been condensed into a table as shown below.

The statistics are presented as a preliminary study of this important question. When the records of the civil-service board are made available, it will be possible to secure more reliable data.

The new act granting vacation leaves instead of sick leaves makes it probable that many cases of trivial illness will not be reported.

The figures presented do not include the municipal or provincial employees.

The number of sick days for each employee, according to the reports received, is as follows:

Health statistics.

Names of bureaus.	Average number of sick days for each employee.				
	First year.	Second year.	Third year.	Fourth year.	Fifth year.
Executive	3.50	5.50	0.00	0.00	0.00
Civil service	1.40	12.50	4.00	0.00	0.00
Insular purchasing agent	3.56	6.37	3.31	0.00	0.00
Education	0.56	3.27	4.37		
Board of health	11.31	11.31	3.02	3.43	0.31
Forestry	10.52	10.52	8.38	0.00	0.00
Mining	3.00	0.00	0.00	0.00	0.00
Public lands	0.00	18.00	7.00	0.00	0.00
Agriculture	5.56	6.18	10.62	0.00	0.00
Government laboratories	10.27	10.27	5.83	0.00	0.00
Philippine civil hospital	21.70	21.70	15.95	6.80	0.00
Philippines constabulary	0.45	3.86	3.18	0.00	0.00
Prisons	5.97	8.16	6.66	1.26	0.00
Coast guard and transportation	3.60	7.23	1.78	1.54	0.42
Coast and geodetic survey	1.57	1.57	4.28	0.00	0.00
Attorney-general	1.16	9.41	1.58	0.00	0.00
Insular treasurer	2.64	3.52	0.47	4.05	0.00
Insular cold-storage and ice plant	8.50	8.50	0.00	0.00	0.00
Public printing	0.00	5.41	5.44	0.00	0.00
Architecture	5.62	1.75	0.50	0.00	0.00
Engineering	0.00	12.93	12.06	0.00	0.00
Public Health and Marine-Hospital Service	0.00	0.00	0.00	0.00	0.00
General average	4.80	7.63	4.47	0.81	0.03

These figures show that the second year in the islands is the critical period in the health of American employees. Where the reverse is indicated the average for the year has been raised by the prolonged illness of one or more employees. Illness occurring during the first year of tropical life is shorter in duration and milder in character than that of the second year, due no doubt to the condition of the system, which possesses more recuperative power than in the second or critical year. The first few months in the Tropics are often characterized by gastro-intestinal disorders, due largely to change in food and water. These disturbances are often increased, and in some cases caused, by the use of alcoholic drinks, taken with the mistaken idea that they are indicated or necessary. This practice is productive of much harm and should be avoided.

REPORTS OF RECEIPTS.

During the year there were received by the cashier of the board of health ₱27,933.64 Philippine currency and $7,595.02 local currency. This money was received from the following sources:

	Philippine currency.	Local currency.
Burial division	₱11,036.10	$5,626.36
Veterinary division	14,017.60	1,884.50
San Lazaro hospital	1,324.00	
Sale of property	510.00	
Sale of vaccine and serums	1,014.60	21.60
Other sources	31.34	62.56
Total	27,933.64	7,595.02

The money collected is accounted for as shown in the tables of the annual report of the disbursing officer.

These tables also give complete data in respect to the amount appropriated by the Commission for the expenses of the bureau.

VETERINARY DIVISION.

This division, now one of the most important connected with the bureau of public health, has been reorganized and its work greatly extended, until it practically reaches every province in the archipelago. It has grown from a force of 1 veterinary surgeon to 15 veterinary surgeons and 30 inoculators, besides several other assistants. These employees are appointed through civil-service examination.

During the year, in the city of Manila, there were examined 94,303 animals at the time of their arrival in the city. At the abattoir, before slaughter, there were 89,299 animals inspected.

A total of 971 animals were condemned on account of disease and their bodies disposed of by cremation.

The diseases of rinderpest and trypanosomiasis (surra) have received considerable attention from the division during the year; 9,319 animals have been inoculated for the purpose of immunizing them against rinderpest. Glanders, also, has been the subject of special work. This disease is very common throughout the islands. It is not understood by the natives nor by the native practicantes of veterinary medicine. In Manila a veterinary surgeon, with a force of inspectors and

disinfectors, made a thorough inspection of the city, killing and causing to be cremated all diseased animals and thoroughly disinfecting the places where they were kept. If this were done throughout the provinces, the disease would soon be eradicated.

Rinderpest and "surra" are still prevalent, several provinces having lost 90 per cent of their carabaos and cattle and 85 per cent of their ponies.

During the month of May, 1903, hæmorrhagic septicæmia was introduced into the islands through the importation of a small herd of carabaos from Hongkong, where the disease was prevalent at that time. Fortunately the infectious nature and deadly character of the disease were recognized before the sick animals were released from quarantine, thus preventing the spread of the disease.

The division needs better facilities for quarantining animals imported into the islands.

These and other matters are discussed in the report of the chief of the veterinary division.

LOCUSTS.

The important matter of destroying locusts has not received from the board of health the attention that it demands, not because it was unrecognized, but because there have been so many things to do that it has been found impossible to attend to all.

The work has been carried on under the provisions of Act No. 817, authorizing and providing for the appointment of a board in each province, with full powers to call upon all able-bodied inhabitants thereof to take united action to suppress the pest, and for other purposes connected with the locust question.

This act covers practically every contingency that may arise, even to the care of the family of any person summoned by the board to take part in the crusade against locusts.

RECOMMENDATIONS.

I renew the recommendations made in my last report.

The need of a general hospital in the city of Manila is obvious to all. Any sacrifice that would not involve the peace of these islands might well be made to secure this hospital.

The need of appropriate asylums for the insane, the fatherless, and the indigent is equally great.

Hospitals should also be established in certain places in the provinces for the care of natives and Americans, especially of those American employees who leave their home under the impression that they are entitled to medical care. One of the most important places requiring a hospital of this kind is Cebu. The need is so urgent that it is earnestly recommended that immediate steps be taken to establish a hospital in that city.

All nations which have established colonies in the Tropics give their attention to the construction and equipping of hospitals and of asylums before they begin other public works.

We find in Formosa, Hongkong, Java, Burma, in the cities of Singapore and Saigon, and elsewhere, admirable hospitals and asylums, where the rich and the needy, the orphans and the insane may be cared for.

It is urgently recommended that every effort be made to remedy the deplorable lack of such institutions in the Philippine Islands.

CONCLUSION.

The commissioner of public health appreciates the friendly and helpful attitude of the surgeons of the United States Army and of the United States Public Health and Marine-Hospital Service, which, with the cooperation of the physicians generally, has done much to facilitate the work of this bureau. The Society of Physicians and Pharmacists of the Philipine Islands has been ably represented on the board of health by its president, Dr. José Alemany, and by his successor, Dr. Felipe Zamora, whose helpful advice has been of great value in dealing with many problems that have come up for solution.

In conclusion, the commissioner of public health desires to express his gratitude to the civil governor for his friendly advice and interest; to the Philippine Commission for its support; and to the secretary of the interior, under whose supervision and direction the work of the bureau of public health is conducted; also to his associates on the board and to the employees of the bureau for their faithful and efficient service, and especially to Capt. Edward L. Munson, of the Medical Department of the United States Army, who, while on detached service as assistant to the commissioner of public health, by overwork, sacrificed his health to the cause of sanitary science in the Philippine Islands.

Very respectfully,

E. C. CARTER,
Major and Surgeon, U. S. Army,
Commissioner of Public Health.

The CIVIL GOVERNOR, *Manila, P. I.*
(Through the secretary of the interior.)

STATISTICAL TABLES.

VITAL STATISTICS FROM SEPTEMBER 1, 1903, TO AUGUST 31, 1904.

Population of Manila, official census of 1903.

Americans	4,389
Filipinos	189,782
Spaniards	2,528
Other Europeans	1,117
Chinese	21,230
All others	895
Total	219,941

Deaths, by race, occurring among residents from September 1, 1903, to August 31, 1904.

Americans	41
Filipinos	10,197
Spaniards	39
Other Europeans	18
Chinese	464
All others	16
Unknown	6
Total	10,781

City death rate per thousand, by race, from September 1, 1903, to August 31, 1904.

Americans	9.34
Filipinos	53.72
Spaniards	15.42
Other Europeans	16.11
Chinese	21.85
All others	17.88
Average	49.01

Classified report, by sex and condition, of all deaths occurring in residents and transients in Manila from September 1, 1903, to August 31, 1904.

MALES.		FEMALES.	
Married	1,121	Married	840
Widowers	271	Widows	413
Single	940	Single	267
Boys	3,899	Girls	3,366
Condition not stated in certificate.	193	Condition not stated in certificate.	46

Total males	6,424
Total females	4,932
Condition and sex unknown	1
Grand total	11,357
Stillbirths	270
Number of deaths with medical attendance	5,392
Number of deaths without medical attendance	5,965
Total	11,357

Deaths by districts, including transients.

District.	Population.	Deaths.	Rate per 1,000.
Walled city	11,463	509	44.40
Binondo	16,613	762	45.86
San Nicolas	29,059	855	29.42
Tondo	39,015	3,051	78.14
Santa Cruz	35,040	1,619	46.20
Quiapo	11,149	604	54.17
Sampaloc	18,779	1,213	64.59
San Miguel	8,858	418	47.29
Paco	6,725	528	78.51
Ermita	12,226	287	23.47
Malate	8,858	528	59.60
Pandacan	2,990	192	64.21
Santa Ana	3,255	177	54.37
Transient residents	15,901	576	36.22
Unknown		38	
Total	219,941	11,357	
Stillbirths		270	

Deaths by age, including transients.

Under 30 days	1,213	50 to 60 years	451
30 days to 1 year	4,901	60 to 70 years	306
1 year to 2 years	549	70 to 80 years	192
2 to 5 years	450	80 to 90 years	96
5 to 10 years	151	90 to 100 years	42
10 to 15 years	105	100 years and over	20
15 to 20 years	313	Unknown	44
20 to 25 years	442		
25 to 30 years	604	Total	11,357
30 to 40 years	879	Stillbirths	270
40 to 50 years	599		

Comparative mortality from January 1, 1900, to August 31, 1904.

Month.	1900.		1901.		1902.		1903.		1904.	
	Number of deaths.	Annual death rate per 1,000. [a]	Number of deaths.	Annual death rate per 1,000. [a]	Number of deaths.	Annual death rate per 1,000. [a]	Number of deaths.	Annual death rate per 1,000.	Number of deaths.	Annual death rate per 1,000. [b]
January	1,055	50.79	753	36.25	760	36.58	602	[a] 28.98	796	42.64
February	884	47.11	689	36.72	706	37.63	511	[a] 27.23	709	40.59
March	887	42.70	885	42.66	770	37.06	539	[a] 25.94	751	40.23
April	805	40.04	896	44.07	1,327	66.01	549	[a] 27.31	748	41.40
May	732	35.24	903	43.47	1,688	81.26	770	[a] 37.06	766	41.03
June	599	29.79	621	30.89	1,418	70.54	592	[a] 29.45	800	44.28
July	787	37.88	608	29.27	2,223	107.02	620	[b] 33.21	866	46.39
August	825	39.71	702	33.79	1,712	82.42	862	[b] 46.17	1,032	55.28
September	1,027	50.01	767	38.15	1,132	56.31	1,228	[b] 67.97		
October	961	46.23	855	41.16	927	44.62	1,217	[b] 65.19		
November	976	48.48	848	42.18	1,035	51.48	974	[b] 53.91		
December	905	43.54	858	41.30	753	36.25	894	[b] 47.89		

[a] Death rate computed on population of 244,732 (health department's census).
[b] Death rate computed on population of 219,941 (official census, 1903).

Number of deaths, with causes, occurring among transients in Manila from September 1, 1903, to August 31, 1904.

[These deaths are not included in preparing death rate of city.]

	Cause of death.	Americans.		Foreigners.		Filipinos.		Chinese.		Total.
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
	I.—*General diseases.*									
1	Typhoid fever (abdominal typhus)		1			3				4
4	Intermittent fever, and malarial cachexia			1		6	1	2		10
4a	Malarial cachexia					5	1			6
5	Variola	1	1	1		4				7
12	Cholera, Asiatic			1		29	12	5		47
14	Dysentery	1	1	2		25	6			35
15	Plague					2	1			3
18	Erysipelas			1						1
19	Other epidemic affections (beriberi)					20	5			25
20	Purulent infection and septicæmia			1		1	1			3
23	Rabies					1				1
26	Tuberculosis of larynx					1	1			2
27	Tuberculosis of lungs	2		2		45	11	3		63
28	Tuberculosis of meninges					1		1		2
29	Tuberculosis, abdominal					1	1			2
32	White swellings						1			1
35	Scrofula					1	1			2
36	Syphilis					1		1		2
40	Cancer and other malignant tumors of the stomach and liver					2				2
45	Cancer and other malignant tumors of other organs and organs not specified					3				3
53	Leukæmia					1				1
54	Anæmia, chlorosis					2				2
56	Acute alcoholism, or chronic			1						1
59	Chronic poisonings							1		1
	II.—*Diseases of the nervous system and the organs of special sense.*									
61	Meningitis, simple					6	9			15
64	Cerebral congestion and hemorrhage			1		2	1			4
66	Paralysis without apparent cause					1				1
67	General paralysis						1			1
68	Other forms of insanity						2			2
69	Epilepsy						3			3
70	Eclampsia (nonpuerperal)					4	4			8
71	Convulsions of children	1				40	32			73
72	Tetanus					3				3
74	Other diseases of the nervous system						1			1

Number of deaths, with causes, occurring among transients in Manila from September 1, 1903, to August 31, 1904—Continued.

	Cause of death.	Americans.		Foreigners.		Filipinos.		Chinese.		Total.
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
	III.—*Diseases of the circulatory system.*									
77	Pericarditis					1				1
78	Acute endocarditis					4	2			6
79	Organic disease of the heart	3		1		4	3	1		12
80	Angina pectoris					2	1			3
81	Affections of the arteries (atheroma, aneurism, etc.)					1				1
82	Embolus and thrombosis			1			1			2
	IV.—*Diseases of the respiratory system.*									
90	Acute bronchitis					9	3			12
91	Chronic bronchitis					4	3			7
92	Broncho-pneumonia			1		1	1			3
93	Pneumonia				1	71	2	2		76
95	Pulmonary congestion and apoplexy						1	1		2
97	Asthma					2				2
99	Other diseases of the respiratory system (phthisis excepted)					1				1
	V.—*Diseases of the digestive system.*									
104	Affections of the stomach (cancer excepted)			1		1	6	1		9
105	Diarrhea and enteritis (under 2 years)		1			4	3	1		9
105a	Diarrhea and enteritis, chronic					6	3	1		10
106	Diarrhea and enteritis (2 years and over)					4	1			5
107	Intestinal parasites					1				1
108	Hernias (intestinal obstructions)					2				2
112	Cirrhosis of the liver			1	1	1	1			4
113	Biliary calculi						1			1
114	Other affections of the liver	1		1						2
116	Simple peritonitis (puerperal excepted)					1	1			2
117	Other affections of the digestive system (cancer and tuberculosis excepted)			1						1
	VI.—*Diseases of the genito-urinary system and its adnexa.*									
119	Acute nephritis					3				3
120	Bright's disease	1	1			15	1	1		19
122	Calculi of the urinary tract					1				1
127	Metritis						2			2
	VII.—*The puerperal state.*									
135	Puerperal hemorrhage						1			1
137	Puerperal septicæmia						2			2
138	Albuminuria and puerperal eclampsia						1			1
140	Other puerperal accidents (sudden death)						1			1
	VIII.—*Diseases of the skin and cellular tissue.*									
143	Furuncle						1			1
	XI.—*Early infancy.*									
151	Congenital debility, icterus, and sclerema					3	2			5
152	Other special diseases of early infancy						1			1
	XII.—*Old age.*									
154	Senile debility					7	1			8
	XIII.—*Affections produced by external causes.*									
159	Suicide by firearms					2				2
160	Suicide by cutting instruments					1				1
164	Fractures					2		1		3
166	Other accidental traumatism	1				2				3
167	Burns		1				2			3
172	Accidental submersion	1		1		2				4
173	Inanition	1								1
176	Other external violence					1				1

Number of deaths, with causes, occurring among transients in Manila from September 1, 1903, to August 31, 1904—Continued.

	Cause of death.	Americans.		Foreigners.		Filipinos.		Chinese.		Total.
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
	XIV.—*Ill-defined diseases.*									
178	Sudden death					1				1
179	Unspecified or ill-defined causes of death					1				1
	Total	13	6	19	2	371	143	22		576
	Grand total	19		21		514		22		576

Mortuary report from September 1, 1903, to August 31, 1904.

[Transients and stillbirths excluded.]

	Cause of death.	Americans.		Foreigners.		Filipinos.		Chinese.		Total.
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
	I.—*General diseases.*									
1	Typhoid fever (abdominal typhus)	1				54	51	3		109
4	Intermittent fever and malarial cachexia					55	37	16	1	110
4a	Malarial cachexia					29	15	11		55
5	Variola	6	1			10	6	1		25
6	Measles						3			3
8	Whooping cough					1	1			2
9	Diphtheria and croup						1			1
9a	Diphtheria					1			1	2
10	Grippe					9	4			13
12	Asiatic cholera	2				205	150	14	1	376
13	Cholera nostras						1			1
14	Dysentery		1	2	1	127	103	50		284
14a	Epidemic dysentery	1								1
15	Plague	1				35	12	36		84
17	Leprosy					17	8			25
18	Erysipelas					3	4	1		8
19	Other epidemic affections (beriberi)			1		123	104	65		293
20	Purulent infection and septicæmia					10	1			11
21	Glanders and farcy					1				1
22	Malignant pustule and anthrax					3				3
23	Rabies					1				1
26	Tuberculosis of larynx					36	22	1		59
27	Tuberculosis of lungs			6		485	365	101	1	958
28	Tuberculosis of meninges					17	15			32
29	Tuberculosis of abdomen					16	16	1	1	35
30	Pott's disease						2			2
32	White swellings					1				1
33	Tuberculosis of other organs					1		1		2
34	Generalized tuberculosis					6	5	2		13
35	Scrofula					5	3	1		9
36	Syphilis					6	4	7		17
39	Cancer and other malignant tumors of the buccal cavity					2	1			3
40	Cancer and other malignant tumors of the stomach and liver					1	6			7
42	Cancer and other malignant tumors of the female genitals				1		5			6
43	Cancer and other malignant tumors of the breast						2			2
44	Cancer and other malignant tumors of the skin					1	1			2
45	Cancer and other malignant tumors of other organs and organs not specified					2	5	2		9
47	Acute, articular rheumatism					6				6
48	Chronic rheumatism and gout					19	21			40
49	Scurvy					1	1			2
50	Diabetes					1	1	1		3
53	Leukæmia					1				1
54	Anæmia chlorosis			1		8	11		3	23
55	Other general diseases						2			2
56	Alcoholism, acute or chronic	2				2				4

Mortuary report from September 1, 1903, to August 31, 1904—Continued.

	Cause of death.	Americans.		Foreigners.		Filipinos.		Chinese.		Total.
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
	II.—*Diseases of the nervous system and the organs of special sense.*									
60	Encephalitis					7	6			13
61	Simple meningitis			2	2	223	171	3		401
62	Progressive locomotor ataxia					2		2		4
63	Other diseases of the spinal cord					1	2			3
64	Cerebral congestion and hemorrhage	1		2		60	46			109
65	Cerebral softening					4	1			5
66	Paralysis without apparent cause					2	3	1		6
67	General paralysis					12	20	5		37
68	Other forms of insanity						1	3		4
69	Epilepsy					2	1			3
70	Eclampsia (nonpuerperal)				2	271	253			526
71	Convulsions of children		1			1,851	1,605	4	7	3,468
72	Tetanus	1				44	48			93
73	Chorea						1			1
74	Other diseases of the nervous system					19	32			51
	III.—*Diseases of the circulatory system.*									
77	Pericarditis					1				1
78	Acute endocarditis			1	1	17	9			28
79	Organic disease of the heart	3		3		33	38	36	1	114
80	Angina pectoris		1	1		23	36			61
81	Affections of the arteries (atheroma, aneurism, etc.)			1		13	15			29
82	Embolus and thrombosis			1		3	4			8
85	Hemorrhages						1			1
86	Other affections of the circulatory system							1		1
	IV.—*Diseases of the respiratory system.*									
88	Affections of the larynx					4	4			8
90	Acute bronchitis	1		1	1	282	250	1	1	537
91	Chronic bronchitis			1		243	213	25		482
92	Broncho-pneumonia					12	18		1	31
93	Pneumonia	1				51	17	2		71
94	Pleurisy			1		4	1			6
95	Pulmonary congestion and apoplexy	1			1	13	13	3		31
96	Gangrene of the lungs					1				1
97	Asthma					16	25	6		47
98	Pulmonary emphysema						1			1
	V.—*Diseases of digestive system.*									
100	Affections of the mouth and its adnexa					4	1			5
101	Affections of the pharynx					2				2
103	Ulcer of the stomach					5	3			8
104	Other affections of the stomach (cancer excepted)			1		31	34			66
105	Diarrhea and enteritis (under 2 years)	2		1	1	71	74	3	1	153
105a	Chronic diarrhea and enteritis	1				285	227	2	1	516
106	Diarrhea and enteritis (2 years and over)			2		21	12	2	2	39
107	Intestinal parasites					5	6			11
108	Hernias (intestinal obstructions)					18	4			22
109	Other affections of the intestines					1	1			2
110	Acute yellow atrophy of the liver	1			1	12	2	3		19
112	Cirrhosis of the liver			1		14	6	1		22
113	Biliary calculi					1	2			3
114	Other affections of the liver			2		8	2			12
116	Simple peritonitis (puerperal excepted)					8	9	1		18
117	Other affections of the digestive system (cancer and tuberculosis excepted)			1		1				2
118	Appendicitis and abscess of the iliac fossa					2	1			3
	VI.—*Diseases of the genito-urinary system and its adnexa.*									
119	Acute nephritis	1		1		27	16	5	1	51
120	Bright's disease	1		1	1	38	32	10		83
122	Calculi of the urinary tract					4				4
123	Diseases of the bladder					2	2			4
125	Diseases of the prostate			1						1
127	Metritis						4			4
128	Uterine hemorrhage (nonpuerperal)						5			5
129	Tumor uterine (noncancerous)						1			1
131	Cysts and other tumors of the ovary						1			1
133	Nonpuerperal diseases of the breast (cancer excepted)						2			2

Mortuary report from September 1, 1903, to August 31, 1904—Continued.

	Cause of death.	Americans.		Foreigners.		Filipinos.		Chinese.		Total.
		Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
	VII.—*The puerperal state.*									
134	Accidents of pregnancy						1			1
135	Puerperal hemorrhage						48			48
136	Other accidents of labor						1			1
137	Puerperal septicæmia		1		1		65		1	68
138	Albuminuria and puerperal eclampsia						13			13
140	Other puerperal accidents—sudden death						5			5
	VIII.—*Diseases of the skin and cellular tissue.*									
143	Furuncle						1			1
144	Warm-acute abscess					1	1			2
	IX.—*Diseases of the organs of locomotion.*									
146	Affections of the bones (nontuberculous)							1		1
147	Diseases of the joints (tuberculosis and rheumatism excepted)					1				1
	X.—*Malformations.*									
150	Congenital malformations (stillbirths excepted)	1				2	4			7
	XI.—*Early infancy.*									
151	Congenital debility, icterus, and sclerema				2	214	158			374
152	Other special diseases of early infancy					38	37			75
153	Lack of care					2				2
	XII.—*Old age.*									
154	Senile debility			1		63	101			165
	XIII.—*Affections produced by external causes.*									
157	Suicide by hanging or strangulation					1		1		2
159	Suicide by firearms	1	1							2
164	Fractures	2				1				3
166	Other accidental traumatism	3		2		21	5	3		34
167	Burns					4	6	2	1	13
171	Electrical shocks					2				2
172	Accidental submersion					21	4	6		31
173	Inanition						2			2
174	Inhalation of deleterious gases (suicide excepted)					3				3
175	Other acute poisonings					1	1			2
176	Other external violence					5	2	1		8
	XIV.—*Ill defined diseases.*									
177	Dropsy					1	1	1		3
179	Unspecified or ill-defined causes of death		1			7	7	3		18
	(64) one male, race unknown; (172) three males, race unknown; (179) two males, race unknown; one Filipino, sex unknown									7
	Total	34	7	41	17	5,463	4,733	451	25	10,781
	Grand total	41		61		10,196		476		10,781

Deaths occurring in Bilibid prison from September 1, 1903, to August 31, 1904.

[Included in yearly report.]

Cause of death.	Presidio.						Carcel.						Total.
	Americans.		Filipinos.		Chinese.		Americans.		Filipinos.		Chinese.		
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
Intermittent fever and malarial cachexia									1				1
Malarial cachexia			3						1				4
Variola			4										4
Cholera, Asiatic			2						4				6
Dysentery			19						9	1			29
Beriberi									3	1			5
Tuberculosis of lungs			51	1	1		2		17				72
Tuberculosis, abdominal									1				2
Generalized tuberculosis			2										2
Syphilis									1				1
Cancer and other malignant tumors of the stomach and liver			1										1
Cancer and other malignant tumors of other organs and organs not specified			1						1				2
Leukæmia									1				1
Chronic poisonings									1				1
Insanity									3				3
Other diseases of the nervous system			1										1
Pericarditis									1				1
Acute endocarditis			2						2				4
Organic disease of the heart										1			1
Pneumonia			59						35		1		95
Other diseases of the respiratory system			1										1
Affections of the stomach (cancer excepted)									1				1
Diarrhœa and enteritis, chronic			1										1
Cirrhosis of the liver			1										1
Simple peritonitis (puerperal excepted)			1						1				2
Acute nephritis			2										2
Bright's disease			4					1	6				11
Calculi of the urinary tract			1										1
Diseases of the urethra, urinary abscess, etc.									1				1
Warm-acute abscess			1										1
Senile debility			5						2				7
Suicide by hanging or strangulation			1										1
Fractures									1				1
Other accidental traumatism			1						1				2
Other external violence									1				1
Unspecified or ill-defined causes of death			1										1
Total			167	1	1		2	1	95	3	1		271

Births reported (incomplete) from September 1, 1903, to August 31, 1904.

Race.	Males.	Females.	Total.
Americans	37	24	61
Filipinos	3,232	2,950	6,182
Spaniards	22	18	40
Other Europeans	8	7	15
Chinese	27	11	38
All others	4	1	5
Total	3,330	3,011	6,341

Annual birth rate per thousand for the year.

Race.	Rate per 1,000.
Americans	13.89
Filipinos	32.57
Spaniards	15.82
Other Europeans	13.42
Chinese	1.79
All others	5.58
Average	28.83

Report of prescriptions filled at the municipal dispensaries from September 1, 1903, to August 31, 1904.

No.	Health district.	Americans.		Foreigners.			
		Adults.		Adults.		Children.	
		Male.	Female.	Male.	Female.	Male.	Female.
1	San Nicolas	1					
2	Tondo	13					
3	Quiapo			2			
4	Santa Cruz						
5	Sampaloc			1			
6	Intramuros						
7	Ermita, Paco, etc	4				11	
	Total	18		3		11	

No.	Health district.	Filipinos.				Chinese.		Total.
		Adults.		Children.		Adults.		
		Male.	Female.	Male.	Female.	Male.	Female.	
1	San Nicolas	372	212	108	70	2		765
2	Tondo	947	893	199	198			2,250
3	Quiapo	513	614	268	157	1		1,555
4	Santa Cruz	491	304	123	107			1,025
5	Sampaloc	1,244	720	588	304			2,857
6	Intramuros	310	369	156	86			921
7	Ermita, Paco, etc	703	712	525	397			2,352
	Total	4,580	3,824	1,967	1,319	3		11,725

Report of sick and wounded city poor attended by municipal physicians from September 1, 1903, to August 31, 1904.

No.	Health district.	Physician.	Foreigners.				Filipinos.				Chinese.				Total.
			Adults.		Children.		Adults.		Children.		Adults.		Children.		
			Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
1	San Nicolas	Dr. V. Cavanna					96	72	44	30					242
		Dr. F. Herrera					39	34	21	13	2				109
2	Tondo	Dr. V. Pantoja	a1				306	345	91	91	2				836
3	Quiapo	Dr. P. Gabriel	5				163	228	106	89	1				592
4	Santa Cruz	Dr. C. Reyes	1				165	136	73	56	3				434
5	Sampaloc	Dr. F. Castañeda					322	436	235	207			1		1,201
6	Intramuros	Dr. R. Perramon	2				105	115	73	72					367
		Dr. F. Herrera					16	21	4	5					46
		Dr. V. Cavanna					59	79	38	37					213
7	Ermita, etc	Dr. C. Mora	1				67	91	63	86					308
		Dr. J. B. Cabarrus	1		4	a1	181	179	139	121					626
	Total		11		4	1	1,519	1,736	887	807	8		1		4,974

No.	Health district.	Physician.	Cured.		Deaths.		Number of visits.
			Male.	Female.	Male.	Female.	
1	San Nicolas	Dr. V. Cavanna	57	57	18	9	1,285
		Dr. F. Herrera	26	27	5	2	511
2	Tondo	Dr. V. Pantoja	270	287	59	57	3,108
3	Quiapo	Dr. P. Gabriel	161	185	40	57	1,215
4	Santa Cruz	Dr. C. Reyes	148	119	34	33	2,096
5	Sampaloc	Dr. F. Castañeda	241	305	92	89	2,749
6	Intramuros	Dr. R. Perramon	110	118	24	17	1,019
		Dr. F. Herrera	8	19	1		145
7	Ermita, etc	Dr. V. Cavanna	47	70	9	10	943
		Dr. C. Mora	49	56	47	53	705
		Dr. J. B. Cabarrus	187	186	58	52	1,620
	Total		1,304	1,429	387	379	15,398

a Americans.

Burials from September 1, 1903, to August 31, 1904.

Cemetery.	Number.	Cemetery.	Number.
Loma (government)	6,606	Chinese	524
Norte (government)	288	Santa Ana	272
Paco general (government)	291	American National	34
Santa Cruz	66	San Pedro Macati	12
Balic-balic	1,520	Sampaloc	5
Tondo	2	Cathedral	1
Binondo	192	Crematory	204
Maytubig	590	Embalmed and shipped	11
Malate	585		
Pandacan (Romano)	389	Total	11,627
Pandacan (Filipino)	35		

Disinterments from September 1, 1903, to August 31, 1904.

Cemetery.	Number.	Cemetery.	Number.
Paco general (government)	99	Malate	5
Norte (government)	1	Tondo	5
Binondo	4	Chinese	229
Santa Cruz	72		
Sampaloc	3	Total	420
Balic-balic	2		

Report of crematories from September 1, 1903, to August 31, 1904.

Matter disposed of.	Crematories.			Total.
	Palomar.	Santa Cruz.	Paco.	
ANIMALS CREMATED.				
American horses	38	61	144	243
American mules	16	13	25	54
Australian horses	16	11	18	45
Filipino horses	169	284	776	1,229
China horses	7	11	21	39
China mules	14	1	9	24
Cows	230	157	282	669
Carabaos	37	39	387	463
Calves	31	31	12	74
Goats	42	17	69	128
Dogs	1,727	261	153	2,141
Cats	1,072	259	96	1,427
Rats	144,295	62,537	2	206,834
Monkeys	11	73	9	93
Fowls	6,670	973	135	7,778
Domestic birds	71	54	9	134
Ducks	170			170
Pigs	1,638	461	108	2,207
Deer	12	14	3	29
Raven			1	1
Sheep	3	6	9	18
Tortoises		2		2
Total	156,269	65,265	2,268	223,802
LOADS CREMATED.				
House garbage	25,746	7,998	11,800	45,544
Trade refuse	3,064	496	550	4,110
Organic matters	670	121	144	935
Waste	2,298	287	1,437	4,022
Market refuse	3,404	682	185	4,271
Condemned goods	1,358	111	21	1,490
Beach refuse	7	7		14
Manure	52			52
Hemp cotton	8			8
Rubbish	243		459	702
Other refuse	266	164	580	1,010
Old sacks	3			3
Total	37,119	9,866	15,176	62,161

Report of operations of the pail-conservancy system from September 1, 1903, to August 31, 1904.

PAILS CLEANED.

Month.	Private houses.	Public buildings.	Public closets.	Provisional collections.	Marquina.	Total.
1903.						
September	24,266	2,660	10,783	3,409	5,927	47,045
October	25,293	2,518	10,222	3,574	6,121	47,728
November	23,587	2,661	9,387	3,558	5,915	45,108
December	23,514	2,872	9,025	3,568	6,130	45,109
1904.						
January	24,280	3,111	9,156	3,689	6,090	46,326
February	22,660	3,196	8,908	3,466	5,700	43,930
March	24,204	3,338	9,670	3,796	6,070	47,078
April	23,990	3,658	9,690	3,760	6,000	47,098
May	24,922	3,937	10,013	3,948	6,200	49,020
June	24,526	3,903	13,020	826	6,000	48,275
July	26,442	4,129	14,570	60	4,200	49,401
August	28,780	4,024	20,860	62		53,726
Total	296,464	40,007	135,304	337,716	64,353	569,844

VAULTS CLEANED.

Month.	Odorless excavators.		Public scavengers.	
	Vaults cleaned.	Loads removed.	Permits issued.	Barrels removed.
1903.				
September	10	205	204	2,448
October	15	137	242	3,228
November	10	100	208	2,747
December	25	171	226	2,636
1904.				
January	29	209	305	3,809
February	20	253	217	3,421
March	47	267	220	2,471
April	32	257	240	2,688
May	36	332	279	3,082
June	49	327	295	3,559
July	46	499	250	3,369
August	97	549	111	1,478
Total	416	3,306	2,797	34,931

General inspections of houses, premises, and vaults, with improvements ordered by medical inspectors, chief sanitary inspectors, and sanitary inspectors, from September 1, 1903, to August 31, 1904.

Houses inspected by chief sanitary inspectors	29,227
Houses reinspected for verification of work ordered	6,716
Houses inspected by sanitary inspectors	255,924
Houses reinspected by sanitary inspectors	116,451
Houses ordered cleaned (written)	69
Houses ordered cleaned (verbal)	54,361
Houses cleaned	49,511
Houses ordered whitewashed and painted	397
Houses whitewashed and painted	235
Houses disinfected	3,076
Houses recommended, condemned, and removed	337
Houses condemned and removed	115
Localities where "squatters" are located	266
Samples of water sent to laboratory	4
Reports from same	3
Houses where garbage has not been removed for two days	1,194

Persons reported sick to municipal physicians	2,512
Cesspools and vaults ordered cleaned	2,854
Cesspools cleaned	2,199
Yards ordered cleaned	22,169
Yards cleaned	19,079
Yards ordered repaired (repaved, etc.)	322
Yards repaired	300
Cholera cases reported by sanitary inspectors	82
Cholera cases reported by auxiliary advisory board	82
Cholera cases found "alive"	171
Cholera cases found "dead"	266
Orders issued during the year	3,326
Orders complied with during the year	3,267
Orders awaiting action	2,231
Orders pending in court	85
Average number of food tiendas in districts	1,422
Persons convicted for violation of food-prohibition order	42
Average in visiting each street and barrio during the year	108
Average number of regular inspectors on duty	27.6
Average number of emergency inspectors on duty	.8
Leper cases sent to San Lazaro Hospital	32
Plague cases reported	95
Smallpox cases reported	70
Houses in which traps are set	179,356
Houses in which bane is placed	15,035
Traps set	470,439
Plates with rat bane placed	48,977
Rats caught by rat catchers	165,926
Rats caught by traps	134,875
Rats caught by poison	343
Rats purchased	1,840
Average number of rat catchers employed	68

Report of disinfections from September 1, 1903, to August 31, 1904.

Cause for disinfection.	Number of disinfections.	Number of contacts.	Cause for disinfection.	Number of disinfections.	Number of contacts.
Cholera	407	1,503	Pseudo farcy	3	
Plague	98	514	Consumption	4	
Smallpox	68	486	Lymphangitis	8	
Glanders	86	5	Rinderpest	24	
Hydrophobia	1		Destruction of mosquitoes	375	
Leprosy	9	16	Insanitary condition	364	
Tumor	1	11	Bedbugs	1	
Surra	35				
Typhoid fever	2	1	Total	1,486	2,539

Vaccine virus distributed by the board of health from September 1, 1903, to August 31, 1904.

Institution.	September.	October.	November.	December.	January.	February.	March.
United States Army	4,905	2,420	3,050	3,180	3,030	3,050	
United States Navy			500		25		
U. S. Public Health and Marine-Hospital Service	2,000	6,000	3,000	5,100	4,000	4,000	
Inhabitants of the Philippine Islands (Manila not included)	47,510	18,200	28,100	73,500	141,200	168,800	196,115
Used by public vaccinators and other institutions in the city of Manila	16,220	11,800	16,220	13,300	12,200	16,435	20,650
Philippines Constabulary						200	
Sold to the public	265	70	50	95	60	375	
Total	70,900	38,490	50,920	95,175	160,515	192,860	216,765

Vaccine virus distributed by the board of health from September 1, 1903, to August 31, 1904—Continued.

Institution.	April.	May.	June.	July.	August.	Total.
United States Army						19,635
United States Navy						525
U. S. Public Health and Marine-Hospital Service						24,100
Inhabitants of the Philippine Islands (Manila not included)	178,910	137,300	113,100	118,000	210,000	1,430,735
Used by public vaccinators and other institutions in the city of Manila	20,200	14,200	48,875	133,300	70,200	393,600
Philippines Constabulary						200
Sold to the public						915
Total	199,110	151,500	161,975	251,300	280,200	1,869,710

Detailed report of vaccine virus distributed by the board of health from September 1, 1903, to August 31, 1904.

Island.	Province.	September.	October.	November.	December.	January.	February.	March.
Bohol	Bohol	2,000		2,000	3,000	3,000	2,000	4,000
Cebú	Cebú	2,000	5,000	200	6,000	5,000	5,000	16,000
Joló	Joló							
Leyte	Leyte	3,000	2,000	6,000		1,000		
Luzon	Abra							1,500
	Albay	2,500	3,400	5,000		1,000		10,000
	Bataan	10				2,000	1,000	2,015
	Batangas					2,500	9,000	12,500
	Benguet		2,000		200		5,000	4,000
	Bontoc	2,200	600		5,600		1,000	
	Bulacan	1,000		2,000	1,000	7,000	10,500	6,000
	Cagayan	10,000	1,000			5,000	6,000	2,000
	Ambos Camarines			200			3,000	2,000
	Cavite			2,000	1,000	8,000	8,000	6,000
	Ilocos Norte	600			1,200	10,000	16,000	10,000
	Ilocos Sur				1,000	1,000	5,000	5,000
	Isabela					3,000		
	La Laguna					3,000	7,600	6,000
	Nueva Ecija	2,000	1,000	7,500	4,500	4,000	4,500	6,000
	Nueva Vizcaya					4,000	4,000	2,000
	Pampanga	1,200	200	700		8,600	8,500	14,000
	Pangasinan	1,000	1,500	1,500	5,700	3,000	6,100	6,000
	Rizal	1,000				6,000	9,600	13,600
	Sorsogon			1,000		2,500		2,000
	Tarlac	1,000			3,000	8,000	6,000	6,000
	Tayabas	2,000	1,500		10,000	13,000		10,500
	Union	8,000			7,000	2,000	4,000	8,000
	Zambales					5,000		1,000
	City of Manila:							
	Public vaccinators	16,000	11,500	16,000	13,000	12,000	16,000	20,000
	Other institutions	220	300	220	300	200	435	650
Marinduque	Marinduque							
Masbate	Masbate					300		3,000
Mindanao	Misamis	8,000			22,300	15,300	9,000	5,000
	Moros						5,000	
	Surigao					3,000		
Mindoro	Mindoro							
Negros	Occidental Negros						14,000	8,000
	Oriental Negros				2,000	2,000	1,000	4,000
Panay	Antique					8,000	2,000	
	Capiz							
	Iloilo							10,000
Romblon	Romblon							
Samar	Samar					5,000	16,000	10,000
Sold and issued to public institutions:								
Medical supply depot, U. S. Army		4,905	1,920	3,550	3,180	3,030	3,050	
U. S. Naval Station, Cavite			500			25		
U. S. Public Health and Marine Hospital Service		2,000	6,000	3,000	5,100	4,000	4,000	
Philippines Constabulary							200	
Cash sales		265	70	50	95	60	375	
Total		70,900	38,490	50,920	95,175	160,515	192,860	216,765

Detailed report of vaccine virus distributed by the board of health from September 1, 1903, to August 31, 1904—Continued.

Island.	Province.	April.	May.	June.	July.	August.	Total.
Bohol	Bohol	6,400	6,300				28,700
Cebú	Cebú	5,000	10,000		55,000	75,000	184,200
Joló	Joló		1,000	3,000			4,000
Leyte	Leyte			1,000			13,000
Luzon	Abra	500	4,000	2,000			8,000
	Albay	10,000		3,000	3,000		87,900
	Bataan	2,500	1,500	1,500		5,000	15,525
	Batangas	7,500	5,000	5,000			41,500
	Benguet			1,100		200	12,500
	Bontoc	2,000					11,400
	Bulacan	4,010	5,000	5,000		3,000	44,510
	Cagayan	7,000	12,000	3,000	53,000	105,000	204,000
	Ambos Camarines	9,000	7,000	8,000			29,200
	Cavite	7,500	4,000	3,000		500	40,000
	Ilocos Norte			5,000		2,000	44,800
	Ilocos Sur	2,500	2,000	000			20,500
	Isabela	5,000	2,000	,000			11,000
	La Laguna	6,000	3,000	3,000		1,000	29,600
	Nueva Ecija	7,500	7,500	500			46,000
	Nueva Vizcaya	4,000					14,000
	Pampanga	8,000	6,000	6,000		100	53,300
	Pangasinan	8,000	6,000	6,000		4,000	48,800
	Rizal	3,000	6,000	1,000		1,000	41,200
	Sorsogon			4,000	2,000		11,500
	Tarlac	11,000	8,000	3,000	1,000	1,000	48,000
	Tayabas	9,500	3,000		500		50,000
	Union	4,000	8,000				41,000
	Zambales	2,000	2,000				10,000
	City of Manila:						
	Public vaccinators	20,000	12,000	44,000	133,000	70,000	383,500
	Other institutions	200	2,200	4,875	300	200	10,100
Marinduque	Marinduque			2,500		3,000	5,500
Masbate	Masbate	9,000	3,000	2,000			17,300
Mindanao	Misamis	5,000		4,500		2,000	71,100
	Moros						5,000
	Surigao		1,500	4,000	2,000	2,000	12,500
Mindoro	Mindoro						
Negros	Occidental Negros	6,000	10,000	11,000	1,000	4,000	51,000
	Oriental Negros	6,000	5,500	4,000			24,500
Panay	Antique			3,000			13,000
	Capiz	10,000		5,000			15,000
	Iloilo	5,000				1,200	16,200
Romblon	Romblon	3,000	3,000	2,000	500		8,500
Samar	Samar	3,000	5,000	5,000			44,000
Sold and issued to public institutions:							
Medical supply depot, U. S. Army							19,635
U. S. Naval Station, Cavite							525
U. S. Public Health and Marine Hospital Service							24,100
Philippines constabulary							200
Cash sales							915
Total		199,110	151,500	161,975	251,800	280,200	1,869,710

Report of vaccinations, city of Manila, from September 1, 1903, to August 31, 1904.

No.	Health district.	September.	October.	November.	December.	January.	February.	March.
1	San Nicolas	1,293	1,572	1,405	1,815	1,361	1,407	2,338
2	Tondo	755	824	879	653	670	642	2,537
3	Quiapo	1,807	1,619	1,387	1,418	779	660	1,069
4	Santa Cruz	994	1,477	844	716	612	628	824
5	Sampaloc	693	770	1,061	710	1,018	667	915
6	Intramuros	583	742	666	712	611	559	775
7	Ermita, Paco, etc	1,288	1,431	1,289	1,382	1,399	1,604	4,793
	Total	7,413	8,435	7,531	7,406	6,450	6,167	13,251

Report of vaccinations, city of Manila, from September 1, 1903, to August 31, 1904— Continued.

No.	Health district.	April.	May.	June.	July.	August.	Total.
1	San Nicolas	2,630	2,411	17,580	5,580		39,392
2	Tondo	1,712	2,194	306	26,066	5,696	42,934
3	Quiapo	783	592	105		689	10,908
4	Santa Cruz	1,679	984	311		16,140	25,209
5	Sampaloc	1,624	1,228	316		713	9,715
6	Intramuros	841	861	26	1,888	48	8,812
7	Ermita, Paco, etc	788	935	84			14,993
	Total	10,057	9,205	18,728	33,534	23,286	151,463

Report of smallpox, city of Manila, from September 1, 1903, to August 31, 1904.

BY NATIONALITY.

Nationality.	Cases.		Deaths.	
	Males.	Females.	Males.	Females.
Americans	19	2	7	2
Filipinos	35	12	14	6
Foreigners	2	1	2	0
Chinese	2	0	1	0
Total	58	15	24	8

BY HEALTH DISTRICTS.

No.	Health district.	Cases.	Deaths.
1	San Nicolas	8	3
2	Tondo	16	7
3	Quiapo	9	5
4	Santa Cruz	18	10
5	Sampaloc	2	2
6	Intramuros	15	4
7	Ermita	5	1
	Total	73	32

BY AGES.

Age.	Cases.	Deaths.
Under 1 year	3	2
1 year to 10 years	14	9
10 to 20 years	16	5
20 to 30 years	22	11
30 to 40 years	8	2
40 to 50 years	4	1
50 years and over	0	0
Unknown	6	2
Total	73	32

Report of plague, city of Manila, from September 1, 1903, to August 31, 1904.

BY NATIONALITY.

Nationality.	Cases.		Deaths.	
	Males.	Females.	Males.	Females.
Americans	1	0	1	0
Filipinos	38	14	38	12
Foreigners	5	1	4	0
Chinese	35	0	32	0
Total	79	15	75	12

Report of plague, city of Manila, from September 1, 1903, to August 31, 1904—Cont'd.

BY HEALTH DISTRICTS.

No.	Health district.	Cases.	Deaths.
1	San Nicolas	47	42
2	Tondo	12	12
3	Quiapo	2	2
4	Santa Cruz	15	14
5	Sampaloc	2	2
6	Intramuros	14	13
7	Ermita	2	2
	Total	94	87

BY AGES.

Age.	Cases.	Deaths.
Under 1 year	0	0
1 year to 10 years	12	11
10 to 20 years	24	23
20 to 30 years	26	25
30 to 40 years	16	12
40 to 50 years	8	8
50 years and over	4	4
Unknown	4	4
Total	94	87

Reports received of lepers living in the various provinces of the Philippine Islands, corrected to August 31, 1904.

Province.	Race.	Number of males.	Number of females.	Children.		Single.		Married.		Widowers.	Widows.	Total.
				Male.	Female.	Male.	Female.	Male.	Female.			
Abra	Filipinos	6	3	1		5	2		1			9
Albay	do	23	22	3	4	14	12	5	3	1	3	45
Ambos Camarines	do	77	27	6	2	36	14	29	8	6	3	104
Antique	do	59	49	13	14	20	15	20	15	6	5	108
Bataán	do	10	2		1	9		1			1	12
Batangas	do	18	11			14	4	3	4	1	3	29
Benguet[a]	Igorrotes	32	11	1	1	1		21	10	9		43
Bohol	Filipinos	78	55	5	3	34	39	35	12	4	1	133
Bulacán	do	20	13			6	8	12	5	2		33
Cagayán	do	46	50	1		22	16	19	21	4	13	96
Cápiz	do	37	15	1		18	10	16	5	2		52
Cavite	do	35	22			27	17	7	2	1	3	57
Cebú	do	675	377									1,052
Ilocos Norte	do	76	38			25	18	43	12	8	8	114
Ilocos Sur	do	137	77	12	2	62	44	45	18	18	13	214
Iloilo	do	82	29	5	2	41	12	24	7	9	8	111
Isabela	do	9	4			3		4	2	2	2	13
La Laguna	do	16	9	1	2	6	3	6	1	3	3	25
Lepanto-Bontoc[a]	do	15	4	1		5	1	8		1	3	19
Leyte[a]	do	50	41	1	3	26	27	20	7	3	4	91
Masbate	do	8	3	1		3	1	2	2	2		11
Mindanao[a]	Moros	143	77	3	3	86	44	45	18	9	12	220
Misamis	Filipinos	39	13	2		20	7	11	3	3	3	52
Negros Occidental	do	22	8	2	2	9	6	10		1		30
Negros Oriental[a]	do	72	44	6	2	27	23	32	14	7	5	116
Nueva Ecija	do	40	19	1		19	9	15	5	5	5	59
Nueva Vizcaya	do	2	4			1		1	2		2	6
Pampanga	do	11	7			3	5	6	2	2		18
Pangasinán	do	33	25		1	11	5	18	15	4	4	58
Rizal	do	41	17	1	1	23	10	16	6	1		58
Romblón	do	9	5			2	2	6	2	1	1	14
Sámar[a]	do	52	40	13	8	15	11	21	18	3	3	92
San Lazaro Hosp	do	133	92	23	11	72	45	26	19	12	17	225
Sorsogón	do	83	34		1	41	18	38	6	4	9	117
Surigao[a]	do		1								1	1
Tárlac	do	22	8			7	5	14	3	1		30
Tayabas	do	12	7			2	3	9	2	1	2	19
Union	do	33	18			10	11	20	7	3		51
Zambales[a]	do	60	35	2		30	15	24	15	4	5	95
Total		2,316	1,316	105	63	758	462	635	272	143	142	3,632

[a] Revised reports not received.

Reports received of insane persons living in the various provinces of the Philippine Islands to August 31, 1904.

Province.	Race.	Number of males.	Number of females.	Children.		Single.		Married.		Widowers.	Widows.	Total.
				Male.	Female.	Male.	Female.	Male.	Female.			
Abra	Filipinos	19	9			11	3	6	2	2	4	28
Albay	do	18	19	2		8	12	5	3	3	4	37
Ambos Camarines	do	69	62	1	4	49	41	15	10	4	7	131
Antique	do	33	27			23	13	9	14	1		60
Bataán	do	12	8			6		5	4	1	4	20
Batangas	do	56	73	2	1	36	41	13		5	13	129
Bohol	do	279	280	11	7	209	212	50	45	9	16	559
Bulacán	do	37	17			25	7	9	6	3	4	54
Cápiz	do	34	38		1	18	17	13		3	9	72
Cavite	do	31	23			22	8	7	10	2	5	54
Cebú	do	447	333	11	3	324	250	95	65	7	15	780
Ilocos Norte	do	53	37	2	1	40	28	8	5	3	3	90
Ilocos Sur	do	93	57	1		63	40	23	10	6	7	150
Iloilo	do	97	94			63	49	25	20	9	25	191
Isabela	do	9	7			5	3	4	3		1	16
La Laguna	do	71	72	3	5	45	40	17	18	6	9	143
Lepanto-Bontoc	do	10	7			6	5	3		1	2	17
Masbate	do	18	20	1	1	12	12	4	4	1	3	38
Mindoro	do	9	7			8	4	1	2		1	16
Misamis	do	70	66	1		51	35	14	17	4	14	136
Negros Occidental	do	41	31		1	32	13	6	9	3	8	72
Nueva Ecija	do	30	17			24	11	5	4	1	2	47
Nueva Vizcaya	do	4	5			4	1		3		1	9
Pampanga	do	31	35			24	19	7	12		4	66
Pangasinán	do	93	86	6	5	45	44	26	22	16	15	179
Rizal	do	42	27			23	16	16	7	3	4	69
Romblón	do	22	5			7	2	12	3	3		27
Sámar	do	32	28			23	20	4	4	5	4	60
Sorsogón	do	86	65			66	40	16	19	4	6	151
Tárlac	do	9	7			6	5	3			2	16
Tayabas	do	111	89	5	1	89	70	12	7	5	11	200
Union	do	32	15	1		18	9	12	4	1	2	47
Zambales	do	9	17			7	7	2	1		9	26
Total		2,007	1,683	47	30	1,392	1,080	447	359	121	214	3,690

Report of cholera, city of Manila, from September 1, 1903, to August 31, 1904.

BY NATIONALITY.

Nationality.	Cases.		Deaths.	
	Males.	Females.	Males.	Females.
Americans	10	0	8	0
Filipinos	257	174	234	162
Foreigners	8	0	5	0
Chinese	18	2	18	1
Total	293	176	265	163

BY HEALTH DISTRICTS.

No.	Health district.	Cases.	Deaths.
1	San Nicolas	82	75
2	Tondo	135	126
3	Quiapo	31	28
4	Santa Cruz	102	90
5	Sampaloc	32	32
6	Intramuros	27	21
7	Ermita	60	56
	Total	469	428

Report of cholera, city of Manila, from September 1, 1903, to August 31, 1904—Cont'd.

BY AGES.

Age.	Cases.	Deaths.
Under 1 year	1	1
1 year to 10 years	50	47
10 to 20 years	70	67
20 to 30 years	165	147
30 to 40 years	81	73
40 to 50 years	51	48
50 years and over	42	40
Unknown	6	5
Total	469	428

Epidemic of cholera in the provinces of the Philippine Islands from September 1, 1903, to August 31, 1904.

Province.	Cases.	Deaths.	Province.	Cases.	Deaths.
Antique	429	312	Leyte	84	58
Ambos Camarines	1	1	Marinduque	373	373
Bataan	236	155	Misamis	141	83
Batangas	84	71	Nueva Ecija	132	102
Bohol	216	165	Negros, Occidental	1,106	827
Bulacan	104	84	Pangasinan	163	96
Cagayan	147	84	Rizal	37	28
Cavite	45	35	Surigao	224	215
Capiz	340	225	Tarlac	200	144
Cebú	4,083	3,420	Tayabas	5	5
Ilocos Norte	7	14	Union	28	26
Ilocos Sur	63	39	Zambales	46	32
Iloilo	325	253			
Isabela	50	26	Total	8,747	6,924
La Laguna	78	49			

Epidemic of cholera in the provinces of the Philippine Islands from April 1, 1902, to August 31, 1904.

Province.	Cases.	Deaths.	Province.	Cases.	Deaths.
Abra	88	47	Misamis	4,621	2,477
Albay	1,142	1,049	Masbate	497	291
Antique	2,485	1,798	Negros Occidental	8,564	2,553
Bataan	1,267	917	Negros Oriental	1,136	861
Batangas	3,433	2,718	Nueva Ecija	1,905	1,514
Benguet	1	1	Nueva Vizcaya	1	1
Bohol	2,706	1,877	Pampanga	1,209	860
Bulacan	1,823	1,363	Panay	69	39
Cagayan	980	672	Pangasinan	7,771	5,478
Camarines (Ambos)	1,403	1,045	Rizal	1,260	757
Capiz	4,650	3,016	Rizal (Fort Wm. McKinley)	3	3
Cavite	876	634	Romblon	200	74
Cebú	14,210	9,983	Samar	1,391	1,345
Ilocos Norte	1,691	1,228	Sorsogon	542	255
Ilocos Sur	1,584	1,067	Surigao	1,022	749
Iloilo	26,427	19,095	Tarlac	986	718
Isabela	82	43	Tayabas	376	246
Jolo	26	21	Union	3,874	2,883
La Laguna	2,981	2,399	Zambales	2,161	1,412
Leyte	1,445	1,098	Zamboanga	273	136
Marinduque	608	532	Miscellaneous	52,522	31,505
Mindanao	69	36			
Mindoro	308	279	Total	160,671	105,075

Epidemic of cholera in the city of Manila and provinces from March 20, 1902, to August 31, 1904.

Month.	Manila.		Provinces.	
	Cases.	Deaths.	Cases.	Deaths.
1902.				
March	108	90	0	0
April	586	406	1,927	1,417
May	550	442	2,407	1,631
June	601	492	5,204	4,097
July	1,368	1,053	7,757	5,807
August	720	581	11,247	7,874
September	273	179	43,346	27,410
October	87	57	30,837	18,572
November	336	236	12,353	6,681
December	35	24	5,918	3,583
1903.				
January	7	4	4,921	2,757
February	2	1	2,997	2,009
March	6	6	1,903	1,124
April	33	27	1,772	1,147
May	230	212	1,402	885
June	39	38	3,554	2,945
July	42	38	4,167	2,806
August	89	72	10,212	7,406
September	290	263	4,613	3,672
October	127	118	2,531	1,969
November	31	26	1,119	937
December	14	13	364	270
1904.				
January	4	5	35	24
February	3	3	61	42
March	0	0	23	10
April	0	0	1	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
Total	5,581	4,386	160,671	105,075

Report of veterinary division of the board of health for the Philippine Islands from September 1, 1903, to August 31, 1904.

On arrival in city:	
Cattle inspected	39,513
Hogs inspected	45,474
Carabaos inspected	3,991
Sheep inspected	818
Goats inspected	602
Horses inspected	3,764
Other animals inspected	141
Total	94,303
In government abattoir:	
Cattle slaughtered	26,277
Hogs slaughtered	62,314
Sheep slaughtered	677
Goats slaughtered	31
Total	89,299

Cattle condemned and cremated	68
Hogs condemned and cremated	218
Horses condemned for glanders	165
Horses condemned for surra	42
Carabaos condemned for surra	103
Other animals condemned	375
Total	971

JOHN G. SLEE,
Chief Veterinary Division.

NOTE.—A number of vaccination forms for the city of Manila are attached to the report, but are omitted for the sake of brevity.

REPORT OF THE CHIEF HEALTH INSPECTOR FOR THE PHILIPPINE ISLANDS.

DEPARTMENT OF THE INTERIOR,
BOARD OF HEALTH FOR THE PHILIPPINE ISLANDS,
OFFICE OF THE CHIEF HEALTH INSPECTOR,
Manila, P. I., September 1, 1904.

SIR: I have the honor to submit herewith report for the year beginning September 1, 1903, and ending September 1, 1904.

The organization of this division as recorded in the last annual report has undergone certain changes; however, the policy then pursued with reference to enforcing sanitation and combating communicable diseases, together with method of procedure, has continued practically without interruption and the result accomplished has been, on the whole, satisfactory.

HEALTH STATIONS AND DISTRICTS IN MANILA.

As recorded in the last annual report, seven health stations remain in operation in Manila, each controlling a health district. During the year it has been advantageous to remove stations C, I, and L to more suitable quarters and stations C and L to locations where it was possible to secure adjoining accommodations for municipal free dispensaries Nos. 2 and 3. Station I also was removed to the lower part of Sampaloc native police station, which is occupied without rent.

The operation of sanitary stations continued without interruption until January 30, 1904, on which date 38 sanitary inspectors (Filipinos) were discharged. Sufficient force did not remain to inspect the city properly. After this reduction there remained only 1 district chief sanitary inspector and 2 sanitary inspectors at three stations, and 1 district chief sanitary inspector and 1 sanitary inspector at four stations. Pending the assignment of police as sanitary inspectors, which it was understood to be the intention of the Commission to do, little general inspection could be accomplished until April 22, 1904, when 14 native police were detailed with the board of health as sanitary police, 2 of whom were assigned to each of the seven stations.

The present locations of health stations are as follows:

Station A (San Nicolas), health district No. 1, at 74 Calle San Fernando. (This station occupies a part of the river and harbor police station without rent.)

Station C (Tondo), health district No. 2, at 132 Calle Azcarraga.

Station F (Quiapo), health district No. 3, at 60 Calle Santa Rosa.

Station G (Santa Cruz), health district No. 4, at 581 Calle Bilibid.

Station I (Sampaloc), health district No. 5, at 45 Calle Bustillos. (This station occupies part of Sampaloc native police station without rent.)

Station J (Intramuros), health district No. 6, at 69 Calle Victoria. (This station occupies a room in Santa Potenciana Building without rent.)

Station L (Malate), health district No. 7, at 288 Calle Herran. (This station controls Ermita, Malate, Paco, Pandacan, and Santa Ana.)



AMERICAN SANITARY INSPECTOR IN UNIFORM.



NATIVE SANITARY INSPECTOR IN UNIFORM.



SEÑOR SATURNINO ESPIJO, CHIEF SUPERVISING VACCINATOR FOR THE PHILIPPINE ISLANDS.



NATIVE VACCINATOR IN UNIFORM.

Sanitary work accomplished by health stations during the year.

	Stations.							Total.
	A.	C.	F.	G.	I.	J.	L.	
Houses inspected by chief sanitary inspector	5,952	782	2,395	6,752	3,983	5,293	4,070	29,227
Houses inspected, verification work	493	382	568	1,725	876	1,822	850	6,716
Houses reinspected by sanitary inspector	49,907	55,506	38,206	37,686	32,270	17,123	25,226	255,924
Houses reinspected by sanitary inspector	7,370	17,862	10,104	8,442	9,991	55,784	6,898	116,451
Houses ordered cleaned:								
Written		4	3	11	27	11	13	69
Verbal	6,389	18,182	7,102	5,091	6,825	7,761	3,011	54,361
Houses cleaned	6,389	16,413	6,788	4,746	5,562	7,761	1,852	49,511
Houses ordered whitewashed or painted	101	37	68	62	58	17	44	397
Houses whitewashed or painted	79	14	42	39	20	13	28	235
Houses disinfected	118	214	202	1,871	80	393	198	3,076
Houses recommended condemned and removed	14	165	101	21	35		1	337
Houses condemned and removed	1		61	11	42			116
Houses garbage not removed for two days		1		12	97	284	800	1,194
Orders complied with	2,281	72	192	171	161	186	204	3,267
Orders waiting action	305	115	415	386	254	288	468	2,231
Orders pending in court		2		9	60	4	10	85
Cesspools and vaults ordered cleaned	70	50	704	1,074	739	53	164	2,854
Cesspools and vaults cleaned	71	41	665	914	407	56	45	2,199
Yards ordered cleaned	1,619	5,082	2,270	3,239	3,729	3,103	3,127	22,169
Yards cleaned	1,619	4,627	2,221	2,709	2,989	3,103	1,811	19,079
Yards ordered repaired (repaved, etc.)	139	2	39	67	10	20	51	322
Yards repaired	123	1	14	60	16	43	43	300
Cholera cases reported by sanitary inspectors	22	22		1	5	31	1	82
Cholera cases found alive	27	56	13	28	9	22	16	171
Cholera cases found dead	40	80	22	53	24	9	38	266
Plague cases reported	48	12	3	15	2	13	2	95
Smallpox cases reported	3	15	9	17	4	17	5	70
Leper cases sent to San Lazaro	2	12	2	8	6	2		32
Orders issued during year	2,270	88	171	166	228	176	227	3,326
Samples of water, foods, etc., sent to laboratory		1		1		2		4
Reports from same		1				2		3
Convictions, violation of food order		1	1	8	32			42
Persons reported sick, municipal physicians	7	835	4		909	630	127	2,511

Rats caught by rat catchers during the year.

Month.	Stations.							Total.
	A.	C.	F.	G.	I.	J.	L.	
1903.								
September	4,272	2,734	5,570	3,521	2,303	956	578	19,934
October	4,682	5,011	5,111	2,099	2,818	890	1,217	21,928
November	4,986	4,166	3,924	2,035	1,842	1,206	1,392	19,551
December	6,642	6,547	3,238	2,429	2,066	2,342	1,374	24,638
1904.								
January	7,082	11,300	1,736	2,442	3,358	3,299	1,888	31,105
February	7,147	11,448	1,256	2,618	3,735	2,803	1,651	30,658
March	8,190	6,532	1,655	2,173	8,697	3,209	1,953	32,400
April	9,574	5,276	2,761	2,581	11,510	4,957	2,856	39,515
May	4,907	1,490	2,350	2,235	5,398	3,578	2,987	25,935
June	3,273	4,192	2,219	2,327	2,553	2,466	1,468	18,498
July	3,146	1,953	2,475	812	1,040	786	495	10,707
August	4,883	4,511	1,847	2,315	1,910	2,466	1,670	19,602
Total	68,883	68,160	34,142	27,587	47,220	28,958	19,529	294,479

Cases detected and disposed of, by health stations, during the year.

Month.	Station A—District No. 1.					Station C—District No. 2.				
	Cholera.	Plague.	Smallpox.	Leprosy.	Insane.	Cholera.	Plague.	Smallpox.	Leprosy.	Insane.
1903.										
September	52	2	2	1		92	2			
October	21	2		1		29	1		1	
November	6					8			1	
December	1		2			4			1	
1904.										
January		5				1			1	
February	2	4				1			1	
March		8					2	3		
April		7	3					3		
May		9	1				1	5	3	
June		2						1	3	
July		2						1		
August		3					2	1	1	
Total	82	44	8	2		135	8	14	12	

Month.	Station C—District No. 3.					Station G—District No. 4.				
	Cholera.	Plague.	Smallpox.	Leprosy.	Insane.	Cholera.	Plague.	Smallpox.	Leprosy.	Insane.
1903.										
September	18					68				
October	11					23		1		
November	1		2	1		5	2	1		
December			1			6	2	1		
1904.										
January	1		1				2		3	
February							3		1	
March			1				1	2	1	
April		1					2	8	1	
May			3				8	2		
June				1				2	1	
July								2		
August		1	1					1	1	
Total	31	2	9	2		102	15	20	8	

Month.	Station I—District No. 5.					Station J—District No. 6.				
	Cholera.	Plague.	Smallpox.	Leprosy.	Insane.	Cholera.	Plague.	Smallpox.	Leprosy.	Insane.
1903.										
September	18					11			2	4
October	12					12				4
November	1			1		3				4
December						1				4
1904.										
January	1						3	1		4
February										4
March		1	1	4			1	3		5
April							5	2		5
May		1		1			3	7		5
June								2		5
July								2	1	6
August			1							4
Total	32	2	2	6		27	12	17	3	54

Cases detected and disposed of, by health stations, during the year—Continued.

Month.	Station L—District No. 7.				
	Cholera.	Plague.	Smallpox.	Leprosy.	Insane.
1903.					
September	31				
October	19				
November	7				
December	2				
1904.					
January	1				
February					
March		2			
April			2		
May			2		
June			1		
July			1		
August					
Total	60	2	6		

VACCINATING SERVICE.

With a view to eradicating smallpox infection from the Philippine Islands, an effort was made to secure sufficient vaccinators to vaccinate the entire inhabitants of the islands, within a period sufficiently brief to control the spread of infection. Pending the receipt of this authority, a careful and systematic scheme, in the form of instructions was prepared and distributed to all city and provincial health officials. Meanwhile, such vaccinators as had been allowed, viz, 100 for the provinces and 15 for Manila, were distributed to those provinces where there appeared to be the greatest need, and in Manila from 1 to 3 were assigned to each health district. Experience very shortly demonstrated that this small number was insufficient to control, much less suppress, smallpox dissemination; besides in the provinces great difficulty was experienced in securing correct reports from and through presidents of provincial boards of health.

After due consideration it was deemed best to modify the first proposed system and take up the work systematically, concentrating the vaccinators and operate them in sections under a medical inspector of this board.

The Manila work was first organized and begun and the government officials and employees were first vaccinated in view of the fact that an unusual number of smallpox cases were then occurring in Manila. Then the health districts in Manila were taken up and are being vaccinated in their order, from 1 to 7. Already the districts of San Nicolas, Tondo, Binondo, Trozo, and part of Santa Cruz have been thoroughly covered, and the fact that 74,400 persons were properly vaccinated from June 7 to August 31, inclusive, indicates the advantage of this method. It is estimated that the entire city of Manila can be canvassed thoroughly by January 1, 1905.

The provincial work has been also organized and the work laid out contemplating the vaccination of all provinces except the Moro country. It is estimated that with the present force the first canvass can be completed within two and a half years. The points selected for concentration and beginning work were Aparri, Cagayan, in the north, and Cebu, Cebu, in the south. Forty vaccinators are operating in each province under the personal direction of medical inspectors detailed for the purpose. The 20 additional vaccinators allowed will be held in reserve in Manila to respond to calls at points where smallpox has appeared in provinces where vaccinators are not then operating; also to assist in vaccinating in and around Manila and supplement from time to time the force operating in the provinces.

Thus it will be seen that by this method the difficulty heretofore experienced as to supplies (particularly vaccine virus), reports, and proper rendition of vouchers will be in the hands of only two medical inspectors who understand the requirements of this bureau.

The order in which provincial vaccination will proceed, as contemplated in instructions already published, is as follows:

In Luzon: Cagayan, Isabela, Ilocos Norte, Ilocos Sur, Abra, Lepanto-Bontoc, Nueva Vizcaya, Benguet, La Union, Pangasinan, Nueva Ecija, Tarlac, Zambales, Bataan, Pampanga, Bulacan, Rizal, La Laguna, Cavite, Batangas, Tayabas, Infanta, Principe, Ambos Camarines, Albay, Sorsogon.

In the Southern Islands: Cebu, Bohol, Negros Oriental, Negros Occidental, Iloilo,

Antique, Capiz, Romblon, Masbate, Leyte, Samar, Misamis, Surigao, Mindoro, Paragua (Cuyo).

The returns from the provinces, as to vaccinations heretofore accomplished, have been difficult to secure and such as have been received are no doubt incorrect. An effort is being made, however, to secure returns for the year ending August 31, 1904, which as yet has not been possible; therefore, a complete report can not be rendered. The new system, however, will enable us to render a prompt and reliable report of all work accomplished, together with results. In addition, it is our purpose to make a thorough canvass of the islands as to the number of insane and lepers during the process of vaccination.

Vaccinations against smallpox accomplished in health districts in Manila by health stations during the year.

Month.	Stations.							Total.
	A.	C.	F.	G.	I.	J.	L.	
1903.								
September	1,293	755	1,807	994	693	583	1,288	7,413
October	1,572	824	1,619	1,477	770	742	1,431	8,435
November	1,405	879	1,387	844	1,061	666	1,289	7,531
December	1,815	653	1,418	716	710	712	1,382	7,406
1904.								
January	1,361	670	779	612	1,018	611	1,399	6,450
February	1,407	642	660	628	667	559	1,604	6,167
March	2,338	2,537	1,069	824	915	775	4,793	13,251
April	2,630	1,712	783	1,679	1,624	841	788	10,057
May	2,411	2,194	592	984	1,228	861	935	9,205
June	17,580	306	105	311	316	26	84	18,728
July	5,580	26,066				1,888		33,534
August		5,696	689	16,140	713	48		23,286
Total	39,392	43,934	10,908	25,209	9,715	8,312	14,993	151,463

Report of vaccinations accomplished in Manila for the period from September 1, 1903, to June 7, 1904.

Month.	Vaccinations accomplished.	Number of takes.	Number of nontakes.
1903.			
September	7,413	1,749	5,664
October	8,435	1,752	6,683
November	7,531	1,684	5,847
December	7,406	1,357	6,049
1904.			
January	6,450	946	5,504
February	6,167	1,178	4,989
March	13,251	2,288	10,963
April	10,057	2,417	7,640
May	9,205	2,359	6,846
June 7	1,564	371	1,193
Total	77,479	16,101	61,378

Report of vaccinations accomplished in Manila from June 7 to August 31, 1904, inclusive, under the new system.

Month.	Vaccinations. accomplished.	Number of takes.	Number of nontakes.
June	17,580	865	6,550
July	33,534	1,018	6,241
August	23,286	3,320	18,454
Total	74,400	5,203	31,245

Total vaccinations accomplished in Manila during the year..... 151,879

Report of vaccinations accomplished in the provinces under the new system:

July 23, to August 31, province of Cagayan..... 36,248

July 14 to August 31, province of Cebu..... 34,011

Inoculation against bubonic plague.

PREVENTIVE (PROPHYLACTIC) SERUM.

Month.	Health districts.							
	No. 1.		No. 2.		No. 3.		No. 4.	
	Primary.	Secondary.	Primary.	Secondary.	Primary.	Secondary.	Primary.	Secondary.
1903.								
September	1							
October				1				
November	289	163	391	346	159	98	971	655
December	328	289	216	170	121	74	547	442
1904.								
January	584	358	1	1				
February	3	2						
March			2	1				
April					8		14	
May		1			1	1	7	
June								
July								
August								
Total	1,205	813	610	519	289	173	1,539	1,097

Month.	Health districts.							
	No. 5.		No. 6.		No. 7.		Total.	
	Primary.	Secondary.	Primary.	Secondary.	Primary.	Secondary.	Primary.	Secondary.
1903.								
September	23	37					24	37
October								1
November	31		31	31	256	138	2,131	1,421
December	22	50	2	2	269	252	1,505	1,279
1904.								
January					139	90	724	449
February							3	2
March					12		14	1
April							22	
May							8	2
June								
July								
August								
Total	79	87	33	33	676	470	4,431	3,192

CURATIVE (ANTITOXINE) SERUM.

Month.	Health districts.							Total.
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	
1904.								
January							11	11
March		2						2
April	20							20
May	34	3				20		57
June	5							5
July	27	29				4		60
August	37	9						46
Total	123	43				24	11	201

River and harbor work for the year in connection with Station A, health district No. 1.

Month.	Inspected.					Fumigated.	Trips made by board of health launch to bay.	Up the river.
	Cascos.	Lorchas.	Schooners.	Steamships.	Launches.			
1903.								
September	1,111	397	135	12	92	2	58	53
October	1,065	552	149		112	3	46	46
November	878	306	61	28	94	2	46	42
December	385	117	53	75	151	19	52	48
1904.								
January	746	230	83	67	148	30	53	55
Total	4,185	1,602	481	182	597	56	255	244

NOTE.—The steam launch formerly rented by the board of health for this work was, for lack of funds, released January 31, 1904, and since that date no systematic inspection or disinfection has been made.

EXTERMINATION AND PREVENTION OF MOSQUITOES.

The work of exterminating and preventing mosquitoes through the methods of drainage, application of oil, etc., was begun July 18, 1904, with a view of determining what practical result could be accomplished in Manila if systematically conducted. Although Manila is low and badly drained, possessing numerous pools of stagnant water, it is believed that by securing the cooperation of household and property owners, which we are endeavoring to do, much good can be accomplished toward relieving the public from the discomfort, annoyance, and danger of malarial fever infection which now exist. Already numerous mosquito-breeding places have been oiled and many others drained by the department of streets and parks, on request of the board of health. This work will be continued until it can be definitely determined what practical results can be obtained.

Extermination and prevention of mosquitoes.

Station.	Month.	Quantity of oil used.	Area oiled.	Houses, yards, etc., inspected for mosquito larvæ.	Canals, pools, cesspools, wells, drains, etc., oiled.
		Ounces.	*Sq. feet.*		
A	July	914		196	128
	August	1,999		200	485
C	July	4,248		462	211
	August	3,970		621	149
F	July	8,300	95,000	822	77
	August	14,720	314,500	995	
G	July	3,533	53,221	600	5
	August	7,844	127,275	457	150
I	July	890		724	195
	August	750		863	144
J	July	512		261	492
	August	1,947		422	786
L	July	6,400		372	60
	August	4,800		567	213
Total		55,827	589,996	7,562	3,095

MUNICIPAL PHYSICIANS.

The number of municipal physicians now employed to render medical attention to the poor and indigent remains the same. One is employed in each of the seven health districts.

During the year the service rendered by these men has increased, as well as their general usefulness to the government. This was accomplished by assigning them definitely to station and district work, consulting with them, and making them feel that they were a part of the district force. The result has been that an interest has been developed in their work never before realized; besides the assistance rendered by them in the study of infant mortality, and in efforts directed to its reduction, has been of much value. It is believed that the municipal physician is better known and more frequently called upon to-day by the poor and indigent than ever before.

The following table shows the work accomplished by municipal physicians for the year:

Municipal physicians' report for the year.

Health district.	Visits.	Prescriptions.	Labor cases.	Wounds and accident cases.
No 1	1,796	765		11
No 2	3,105	2,182	6	52
No 3	1,215	1,555	1	14
No. 4	2,096	1,025	4	26
No. 5	2,749	2,857	1	9
No. 6	2,107	921	2	3
No 7	2,325	2,287		14
Total	15,393	11,592	14	129

Names and assignment of municipal physicians.

Health district.	Assignment.	Name of physician.
No 1	San Nicolas and Binondo	F. Herrera.
No 2	Tondo	V. Pantoja.
No. 3	Quiapo	P. Gabriel.
No 4	Santa Cruz and San Miguel	C. Reyes.
No. 5	Sampaloc	F. Castañeda.
No. 6	Intramuros	V. Cavana.
No. 7	Paco, Ermita, Malate, etc	J. B. Cabarrus.
	Work among Chinese	Tee Han Kee.

MUNICIPAL FREE DISPENSARIES.

The work accomplished by the municipal free dispensary in the district of Quiapo was so gratifying, and the necessity for others so apparent, that two additional dispensaries were established, one in the district of Tondo and the other in the district of Paco, adjoining the health and sanitary stations of these districts. At first the poor and indigent looked upon these dispensaries with distrust, and for the first month very little was accomplished. Gradually, however, the purpose of the dispensary was demonstrated, confidence was established, and month by month since the number of poor and indigent has increased, so that to-day, particularly during the morning hours, a large number of sick and injured may be found at the dispensaries receiving treatment from the district medical inspector and the municipal physician. It is believed that the good to be accomplished through this means, in so far as establishing confidence among this class of people in the board of health goes, together with alleviating suffering and reducing mortality, is really just beginning.

Services rendered by municipal free dispensaries during the year.

No. 1.–QUIAPO.

Month.	Prescriptions filled by municipal physicians.	Persons to whom medicine was given.	Persons receiving surgical dressings.
1903.			
September	710	330	16
October	515	243	11
November	667	353	34
December	521	277	19
1904.			
January	571	310	26
February	371	180	16
March	345	173	12
April	403	183	27
May	641	208	25
June	631	254	15
July	679	269	34
August	786	338	28
Total	6,840	3,118	263

Services rendered by municipal free dispensaries during the year—Continued.

No. 2.—TONDO.[a]

Month.	Prescriptions filled by municipal physicians.	Persons to whom medicine was given.	Persons receiving surgical dressings.
1903.			
September			
October			
November			
December	43	19	
1904.			
January	117	59	3
February	145	71	4
March	168	75	9
April	229	81	11
May	319	113	18
June	386	140	25
July	665	138	41
August	776	151	43
Total	2,848	847	154

No. 3.—PACO.[a]

1903.			
September			
October			
November			
December	43	14	1
1904.			
January	137	72	
February	201	100	1
March	197	92	1
April	244	93	6
May	179	61	4
June	216	71	
July	261	61	10
August	559	122	7
Total	2,037	686	30

RECAPITULATION.

1903			
September	710	330	16
October	515	243	11
November	667	353	34
December	607	310	20
1904.			
January	825	441	29
February	717	351	21
March	710	340	22
April	876	357	44
May	1,139	382	47
June	1,233	465	40
July	1,605	468	85
August	2,121	611	78
Total	11,725	4,651	447

[a] Opened in December, 1903.

Prescriptions filled from each district during the year.

Month.	Health district.							Total.
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	
1903.								
September	31	25	53	65	334	105	97	710
October	35	12	74	64	177	97	56	515
November	39	7	94	94	235	86	112	667
December	35	29	77	58	238	77	93	607
1904.								
January	21	92	113	105	276	81	72	760
February	18	127	95	81	165	30	201	717
March	18	150	119	43	170	13	197	710
April	33	196	131	68	181	23	244	876
May	56	263	188	107	229	117	179	1,139
June	22	365	195	79	292	64	216	1,233
July	214	451	214	130	261	74	261	1,605
August	243	533	202	131	299	154	624	2,186
Total	765	2,250	1,555	1,025	2,857	921	2,287	11,725

FREE MUNICIPAL MIDWIFE SERVICE.

The difficulty of keeping records of the services rendered by municipal midwives under the old régime led to their assignment as part of the personnel of health stations and their operation in health districts under the direction of the district medical inspectors and the municipal physicians.

The result has been that the number of births reported has increased from a few monthly to several hundred in some districts, and the number of births actually attended by midwives has also increased proportionately. This gives a better opportunity of studying the causes leading to the excessive infant mortality, which has kept the general mortality of Manila at almost double what it normally should be.

The following table shows the work of the municipal midwife service for the year, together with the increase in birth reports following the changes made August 13, 1903:

District midwife report for the year.

Health station.	Number of midwives.	Births reported.	Births attended.
No. 1	1	263	129
No. 2	2	1,263	641
No. 3	1	142	84
No. 4	1	105	35
No. 5	1	250	164
No. 6	1	78	40
No. 7	1	240	19
Total	8	2,341	1,112

It will be seen by this report that the total number of births reported is small in comparison with the mortality report, and this, if true, would seem to indicate a gradual decrease in the population. However, it must be remembered that birth reports have not been forced and could not be without a large number of domiciliary inspectors, and that there is every reason to believe that the number of births reported does not represent probably more than one-half of those occurring, as demonstrated by infant death reports and other developments caused by sanitary inspections and vaccinations. Granting, then, a birth rate of 53.72 per thousand in comparison with a death rate of 47.12 per thousand, the difference shows an average gain in population of 6.60 per thousand.

The efforts directed toward reducing the excessive infant mortality in Manila, which averages approximately 50 per cent of all deaths under 1 year of age, have so far proved gratifying. It is always difficult to inaugurate new methods among the Filipino people, and in order to do so successfully it is necessary first to gain their confidence. However, by careful and painstaking work, it is believed their confidence is being gained. There is probably no subject upon which these people have less knowledge than that of childbirth, as indicated by the mortality. Interfering, as they do, with the functions of nature through ignorance is largely the cause of the excessive infant mortality. This matter has been the subject of special study by the district medical inspectors for many months, and certain causes were discovered which it was thought could be remedied at least in part. First, it was found that, to

the improper treatment of the umbilical cord by the natives could be attributed a certain large percentage of deaths. To remedy this the umbilical packet containing sterilized dressings for the cord, with simple instructions as to its use, was introduced first through the municipal midwife, then through the health stations and municipal free dispensaries. These packets are now meeting with favor, and more than 300 per month are being distributed and used. The results, so far as observed, have been satisfactory. The second cause of an unnecessarily large percentage of mortality was found to be exposure of the new-born infant to atmospheric changes without proper protection. As the abdomen and chest were the vital parts concerned, an abdominal bandage of sufficient size to cover these parts was secured and issued in the same manner as the umbilical packet. These, also, are now in demand, and have unquestionably accomplished much good.

In connection with the calculation of the relation of births to deaths it became necessary to retake the census of certain districts in Manila. This was accomplished by concentrating all sanitary inspectors and vaccinators in the district, subdividing the district and assigning one man to each subdivision, then beginning systematically and finishing within a definite time, then changing the men and checking up the count. In the district of Paco, particularly, a considerable discrepancy was found between our count and that of the recent census, the increase being in favor of the board of health count. This increase is accounted for to some extent by the number of laborers and their families who have come in from the provinces to work on the electric-railway system, now in course of construction.

The health district population, taken from the census as given below, is believed to be much smaller than the true figures and gives an excessive mortality per thousand.

Health district.	Population.	Health district.	Population.
No. 1	53,573	No. 6	17,463
No. 2	39,045	No. 7	28,054
No. 3	18,487		
No. 4	43,040	Total	219,941
No. 5	20,279		

QUARANTINABLE DISEASES.

The reduction in the case number of quarantinable diseases in Manila is now becoming so small that they cease to become a factor in computing mortality. Especial attention is invited to the fact that during the past year the three principal quarantinable diseases have occurred only as follows, and in comparison with the two preceding years show a marked reduction, cholera having disappeared:

Date.	Smallpox.		Bubonic plague.		Asiatic cholera.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
September—						
1901 to 1902	56	22	29	30	3,933	3,064
1902 to 1903	101	17	198	166	1,179	894
1903 to 1904	73	32	94	87	469	428

SPECIAL INSPECTIONS.

In addition to the regular and systematic district inspections, special inspections have been made of the cleaning and disposal of garbage, dead animals, night soil, contents of cesspools, and of the sanitation of houses, factories, mills, schools, prisons, dairies, markets, meat shops, bakeries, public water supplies, wells, cisterns, cemeteries, undertaking establishments, asylums, jails, barrooms, theaters, and all public institutions and places of public resort. Numerous insanitary conditions have been remedied as a result of these inspections, and on the whole it may be stated that the present sanitary condition of all such places is reasonably good. Three hundred and twenty-two complaints have been received from citizens of Manila as to insanitary conditions in or near their residences, all of which have received prompt attention.

BILIBID PRISON.

The sanitary condition of this prison is probably as good as it could be under the circumstances.

The excessive number of prisoners and the fact that new prisoners from the provinces reach the institution usually in reduced physical condition make it impossible to maintain the mortality at a low figure.

As this report closes the prison contains 4,476 prisoners—4,377 males and 99 females—and the morning sick report shows 42. The mortality for the year reaches the high figure of 70.95 per thousand.

SANITARY INSPECTION OF SCHOOLS.

In Manila there are 42 public schools and 71 private schools.

Of the public schools 15 are for boys, 13 for girls, and 14 for both. Very few of the buildings used for public schools are suitable for the purpose; most of them are devoid of the proper sanitary conveniences. These schools have an average attendance of 5,672 during the day and 4,377 during the night session.

Only 1 public school has a dormitory, and this is in a separate building. The health of these students, about 40 in number, is good. City water is used for drinking purposes in all public schools except 5; of these 2 use sterilized and 3 cistern water.

Of the 71 private schools 22 are for boys, 19 for girls, and 30 for both.

The number of pupils enrolled is, approximately, 6,647, and of these 648 reside in dormitories. Many sanitary improvments have been made in both schools and dormitories during the year, but there is much still to be done. The health of dormitory pupils is good, and seldom is a case of serious illness recorded.

In all private schools city water is used for drinking purposes except in 13; of these 5 use cistern water, 7 filtered, and 1 boiled water.

In both public and private schools intestinal disorders are reported to be rare.

PUBLIC SCHOOLS.

	Health districts—							Total.
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	
Boys' schools	1	2		5			4	12
Girls' schools				3			4	7
Mixed schools	1	4	3	3	1	1	5	18
Total	2	6	3	11	1	1	13	37
Pupils enrolled:								
Boys	60	342		1,470			1,008	2,880
Girls				490			341	831
Mixed	525	1,292	1,923	47	348		1,142	5,277
Total	585	1,634	1,923	2,007	348		2,491	8,988
Sanitary condition of buildings	Good.	Poor.	Fair.	Poor.	Fair.	Fair.	Good.	
Drinking water:								
City	2	6	3	11	1	1	8	32
Sterilized							2	2
Cistern							3	3

PRIVATE SCHOOLS.

Boys' schools	2	3	3	8		4	2	22
Girls' schools		1	4	5		4	5	19
Mixed schools	2	7	2	9	7	2	1	30
Total	4	11	9	22	7	10	8	71
Pupils enrolled:								
Boys	119	189	422	333			586	1,649
Girls		147	373	274		541	716	2,051
Mixed	230	162	88	1,500	179	715	73	2,947
Total	349	498	883	2,107	179	1,256	1,372	6,647
Resident students:								
Boys		22	53	17			180	272
Girls			115				155	270
Mixed	23	48	28		4		3	106
Total	23	70	196	17	4		338	648
Health of students	Good.		Good.	Good.	Good.	Good.	Good.	
Sanitary condition of buildings	Good.	Fair.	Fair.	Poor.	Fair.	Good.	Good.	
Drinking water:								
City	8	11	6	19	7	6	6	38
Cistern			1			4		5
Filtered	1		2	2			2	7
Boiled				1				1

SANITARY INSPECTION OF PLACES OF BUSINESS BEFORE GRANTING LICENSES.

Certain applications for licenses to inaugurate new business and applications for renewal of licenses are referred to this division in order that the sanitary condition of the premises may be passed upon and a recommendation made as to the advisability of granting or refusing the application.

Through this means many of the extremely insanitary tiendas and other places have been denied the privilege of conducting a business. The property, therefore, remains vacant and the owner soon sees the necessity for either rebuilding or placing the premises in a sanitary condition. The recommendations of this division as to the granting or refusal of license application have been almost invariably supported by the municipal board: License applications acted on, 912; approved, 810; disapproved, 102.

SANITARY SUPERVISION OVER PUBLIC PROSTITUTES.

The examination of public prostitutes in the district of Sampaloc and Calle Ilang-Ilang, for the purpose of detecting those having venereal diseases and their removal to San Lazaro Hospital, has continued without interruption. This work is conducted systematically and thoroughly by the medical inspector of the district. However, the records for the present year show that there has been practically no reduction in the number found diseased upon weekly examination.

During the preceding year there were an average of 375 prostitutes in the district, and an average of 1,046 examinations were made monthly. Of this number an average of 67 women were found diseased monthly and transferred to San Lazaro Hospital. These figures, compared with those of the present year, show that practically no decrease has occurred in the number of diseased cases during a two-year period.

This appears to be due to the system in vogue, in that the male sex is not subject to examination and the disease is continually transmitted. The chief health inspector is of the opinion that until prostitutes are placed in another locality and under such conditions that police and sanitary supervision over them can be made more perfect and that all males desiring to enter this particular district shall be found, upon examination, free from disease, it will be impossible to accomplish permanent results from a sanitary standpoint.

Month.	Number of examinations.	Number of slides taken.	Women examined.	Women sent to San Lazaro Hospital.	Gonorrhea cases.	Chancroid cases.	Syphilitic cases.
1903.							
September	1,497	1,497	408	75	71	4	
October	1,237	1,237	414	85	82	3	
November	1,411	1,411	399	81	77	4	
December	741	741	361	46	37	9	
1904.							
January	1,298	1,298	408	95	77	18	
February	1,155	1,155	372	82	71	11	
March	1,116	1,116	362	93	84	9	
April	915	915	295	103	72	30	1
May	1,154	1,154	356	93	61	31	1
June	1,106	1,106	361	68	54	14	
July	1,066	1,066	345	80	57	23	
August	1,002	1,002	315	70	58	12	
Total	13,795	13,795	4,796	971	800	168	2

NOTE.—The number of cases transferred to San Lazaro Hospital, as recorded in this report, differs somewhat from the report of the hospital for two reasons: first, certain cases were transferred for examination only; second, others were transferred from other sources.

SAN LAZARO HOSPITALS.

This institution has made continued improvement since the rendition of the last annual report and is now operating on a basis more satisfactory than ever before. The opening of the new infectious-disease wards on February 10, 1904, marked an epoch in health work in the Philippine Islands which has already been far-reaching in its effect. On this date the buildings, complete and ready for occupancy, were thrown open to the public for inspection, a notice to that effect having been previously sent out. Special effort was made to have all Spanish and Filipino physicians in Manila inspect the hospital. The results were most gratifying. More than 500 people responded to the invitation, and expressions of approval, mingled with those of

great surprise, were heard on every hand complimentary of the arrangement and equipment of the institution.

The day following the public opening the cases on hand in the old buildings outside the inclosure were transferred over, and since that date the new institution has been able to well subserve the purpose for which it was intended.

AMERICAN TRAINED NURSES.

Probably no single item of improvement has equaled that demonstrated by the inauguration of the service of American trained female nurses at the opening of the new infectious-disease wards. Under proper authority the services of one chief nurse and five nurses were secured, especial care being exercised in their selection. Their duties are confined to the new infectious-disease hospital and the women's department, and the services rendered by them have been of the highest order. Also the training by them of the Filipino and Japanese nurses in the women's department has resulted most beneficially and has given a smoothness and refinement to this department which it never before enjoyed.

The work rendered by the hospital for the year is given below, condensed for comparison:

San Lazaro hospital, morgue, crematory, and disinfecting plant—Consolidated report for the year.

LEPER DEPARTMENT.

	1903.				1904.								Total.
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	
Cases on hand	202	202	204	208	207	206	213	218	218	221	224	227	2,550
Cases received	4	4	5	5	6	8	8	8	9	11	3	2	73
Cases died	2	1	1	1	3	1		5	3	6		3	26
Cases escaped	1			4	4		2	1	2	2			16
Cases discharged to provinces or China	1	1		1			1	2	1			1	8
Cases remaining	202	204	208	207	206	213	218	218	221	224	227	225	2,537

WOMEN'S DEPARTMENT.

Cases on hand	74	75	75	84	39	79	101	72	136	95	75	85	990
Cases received	71	105	81	57	93	92	67	139	93	84	87	72	1,041
Cases died													
Cases transferred	2	1		1		1	1	3	1	1			11
Cases discharged	68	104	72	101	53	69	95	72	133	103	77	51	998
Cases remaining	75	75	84	39	79	101	72	136	95	75	85	106	1,022

CHOLERA DEPARTMENT.

Cases on hand	2	2	1		1								6
Cases received	72	28	9	4	1								114
Cases died	56	23	6	3	1								89
Cases transferred	1	2											3
Cases discharged	15	4	4		1								24
Cases remaining	2	1		1									4

PLAGUE DEPARTMENT.

Cases on hand	1					1	2		1				5
Cases received	1		1		4	4	2	4	1				17
Cases died	1				2	1	2	3	1				10
Cases transferred					1	2							3
Cases discharged	1		1				2		1				5
Cases remaining					1	2		1					4

SMALLPOX DEPARTMENT.

Cases on hand	2	1	1	1	1	2		4	5	7	1	1	26
Cases received	1	2	3	2	1		10	10	17	5	3	4	58
Cases died	1		2	2				3	4	1		3	16
Cases transferred							1	1	1	2			5
Cases discharged	1	2	1			2	5	5	10	8	3	2	39
Cases remaining	1	1	1	1	2		4	5	7	1	1		24

San Lazaro hospital, morgue, crematory, and disinfecting plant—Consolidated report for the year—Continued.

MORGUE.

	1903.				1904.								Total
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	
Bodies on hand	9	9	1			1	1	1			3		25
Bodies received	211	102	38	36	29	21	53	32	41	25	33	24	625
Bodies cremated	106	72	15	3	1	1	1	1	1	2	1		204
Bodies buried	105	38	24	33	27	20	32	32	40	20	35	24	430
Post-mortems	34	14	12	19	20	13	20	13	17	13	12	8	195

CREMATORY.

Bodies cremated	106	72	15	3	1	1	1	1	1	2	1		204

STEAM DISINFECTING PLANT.

Articles of clothing disinfected	21	22	12	11	2	8	39	48	70	36	16	15	300
Bedding disinfected	9	9	12	9	4	6	30	42	66	32	12	18	249
Miscellaneous	6	4	9	3	2	2	80	96	70	42	8	10	332

CORRAL.

The ambulance corral, formerly under the control of the board of health direct, was transferred to the insular purchasing agent on November 1, 1903; since that date its maintenance has been entirely in the hands of the insular purchasing agent, the board of health using the transportation in the same manner as formerly.

The reduction in the demand for ambulances, dead wagon, and disinfecting carts has of course correspondingly reduced the service rendered.

Report of service rendered by corral during the year.

Plague cases transferred	21
Cholera cases transferred	145
Smallpox cases transferred	71
Leper cases transferred	73
Total	310

Disinfecting service.

Houses disinfected	1,420
Corrals disinfected:	
Insanitary condition	69
Glanders	60
Surra	34
Lymphangitis	18
Cattle stables to prevent rinderpest	34

Dead-wagon service.

Bodies transferred to morgue	709

Pail-system service.—(Now under municipal board.)

DELIVERY-WAGON SERVICE.

A light delivery wagon is used in connection with the storehouse and in delivering supplies to stations, hospitals, and wharves for shipment by vessels.

STOREHOUSE.

The removal of the storehouse from San Lazaro Hospital to quarters in the Potenciana Building has greatly improved the facilities for properly carrying on this important division of the bureau. All light and frequently called for supplies are kept in this storehouse to facilitate delivery; however, heavy supplies and those not frequently in demand are still kept in the old quarters at San Lazaro.

MEDICAL INSPECTORS AND INSPECTIONS.

The number of medical inspectors now allowed the board of health is 18. During the year nearly all provinces have been inspected with reference to organization and work accomplished by provincial and municipal boards of health, and to prevailing diseases and customs and habits of the people with regard to health and sanitation.

In order to systematize provincial inspection the islands were divided into provincial health districts, and these districts have been taken up as medical inspectors have been available, and much reliable information has been secured for the use of this board.

During the year several changes have occurred in the personnel of medical inspectors by reason of resignations and death and the appointment of new men.

DISTRICT MEDICAL INSPECTORS.

Professional work accomplished in Manila during the year.

Station.	Sick visited.	Diagnoses made of quarantinable diseases.	Criminal cases investigated.	Accident cases attended.
A	240	136	10	14
C	362	169	14	22
F	92	44	3	10
G	210	145	4	18
I	192	42	2	9
J	322	59	6	16
L	214	68	8	11
Total	1,632	762	47	100

SANITARY INSPECTORS.

The sanitary inspectors allowed the board of health have also undergone several changes during the year through resignation. The present personnel, composed of 12 Americans and 10 Filipinos, have, in addition to their regular work in Manila, been given special duties during the year, and without exception the service rendered by them has been intelligent and conscientious. During the year the sanitary work maintained by the board of health in the Mariquina Valley has been under the personal direction of a sanitary inspector. It was found necessary during the early part of the year to send sanitary inspectors to the provinces to conduct health measures for the suppression of Asiatic cholera. In each instance the work was conducted intelligently and terminated successfully.

For months a sanitary inspector has been detailed in Cebu, province of Cebu, in connection with the operations of the insular board of health in suppressing plague and placing the city in a sanitary condition. The reports received from the medical officer in charge indicate that excellent service has been rendered by this inspector.

The sanitary inspector detailed as morgue keeper at the board of health morgue, San Lazaro, continues to perform his duties in a creditable manner.

The sanitary inspector detailed in the division of sanitary engineering continues to render a high class of service and to perform his duties in an intelligent manner.

At present a sanitary inspector is on special duty at Culion leper colony.

The board has recently lost by resignation two excellent sanitary inspectors who have had two or more years experience in health work in Manila and the provinces. These men resigned to enter private business pursuits, claiming that as there was no opportunity for promotion in their grade they could better their salaries elsewhere. As per my former recommendation to the board, it would be well to make it to the interest of the best of these men to remain in the service, giving them a salary at least equal to a lieutenant or sergeant of police, with an increase of 10 per cent after two years faithful and satisfactory service.

Assistant sanitary inspectors.—The force of assistant sanitary inspectors was composed formerly of 48 Filipinos, but on January 30, 1904, was reduced to 10. These men are all on duty at stations with the exception of one who is on duty in Cebu, and render service as station record clerks in charge of rat catchers and subdistrict inspections.

SANITARY POLICE.

In March, 1904, 25 native police were requested for assignment to the board of health as sanitary inspectors. On April 22, 1904, 14 only were thus assigned, the police department being short of men. Three additional policemen were subsequently assigned, making a total of 17 men. Two of these men were placed at each of the seven stations, and one additional at station A, and two additional men at station C. The men assigned were intelligent, and from the day of their detail have worked well and learned rapidly. Not a single instance has arisen where it has been necessary to report other than excellent conduct, and no conflict of authority has arisen. An arrangement was made with the municipal board, that for the purpose of discipline only, these men were to remain under the police department, but for all other purposes they are under the board of health. By making no changes in this detail, a very efficient corps of sanitary police will soon be evolved, and when a sufficient number are detailed to properly inspect the city within a period sufficiently brief to maintain the cleanliness of the city, this method will be an improvement over the former.

SANITARY CONDITIONS OF HOSPITALS AND ASYLUMS IN MANILA.

San Lazaro Hospital.—Considering the character of the building, and with the sanitary arrangements recently instituted, it may be said that the old building is now in probably as good sanitary condition as it could reasonably be. The new building is in excellent condition.

Civil Hospital.—This building is not well adapted for the purpose of a hospital. Since an overflow has been laid to the Calle Alix estero, the chief complaint in connection with the cesspool and sewerage of the building has been remedied.

San Juan de Dios Hospital.—This institution continues to be maintained in a creditable manner. The greatest difficulty has been its sewerage arrangements. Within the last three months this has been entirely remodeled under orders from the board of health and the difficulty frequently experienced has been remedied.

Hospicio de San José.—The sanitary condition of this institution is very good considering the system in vogue, and the building is maintained in a cleanly manner. The quarters for the insane are not well adapted for the purpose. However, they are kept scrupulously clean and the treatment accorded the inmates is as good as circumstances will permit.

SANITARY SCHOOL OF INSTRUCTION IN MANILA FOR PRESIDENTS OF PROVINCIAL BOARDS OF HEALTH.

The recommendation made May 8, 1903, as to the necessity for bringing the Filipino presidents of provincial boards of health to Manila for instruction materialized December 1, 1903. A system of instruction was devised covering a period of one month, and devoting to each department of health work in Manila sufficient time to give an insight into the method of procedure.

Five classes were ordered to Manila, each of which was composed of from five to eight provincial health officers, depending upon the convenience of the official and facility with which he could reach Manila. The entire course was completed in less than six months.

Upon returning to their homes each official was requested to write a thesis upon his observations, and, judging from these reports taken as a whole, the Filipino provincial health officers have now better ideas of health matters than ever before, and it would appear that both time and funds expended for this purpose should make ample return.

The course given each class while in Manila was as follows:

Two days, office of veterinary surgeon, Potenciana Building. Hours, 8 to 12 a. m., 2 to 5.30 p. m., except Sunday. Nights at abattoir. Instruction in clinical and post-mortem diagnosis of epidemic diseases of domestic live stock; examination of live stock and meat at abattoir.

Two days, office sanitary engineer, city of Manila, Potenciana Building. Hours, 8 to 12 a. m., 2 to 5.30 p. m., except Sundays. Instructions: Inspection of plumbing and method of operating the pail conservancy system.

One day, office chief of vaccinators. Hours, 8 to 12 a. m., 2 to 5.30 p. m., except Sundays. Instruction: Method of vaccinating and recording vaccinations.

Six days, station A, board of health (San Nicolas), health district No. 1, also river and water-front service. Hours, 8 to 12 a. m., 2 to 5.30 p. m., except Sundays. Instructions: (*a*) Observing the general working of a sanitary station; (*b*) the methods of sanitary, house, and food inspection; (*c*) disinfection; (*d*) plague inoculation; (*e*) treatment of plague and cholera houses; (*f*) services of sanitary orders; (*g*) diagnosis and removal of infectious cases; (*h*) rat destruction in prevention of plague.

Three days, office chief quarantine officer for the Philippine Islands. Instruction in ship inspection, quarantine and ship disinfection.

Six days, San Lazaro hospitals. Departments of cholera, plague, smallpox, leprosy, women's, morgue, crematory, and steam disinfecting plant. Instruction: Management and equipment, treatment of the sick, methods of making post-mortem examinations, disposal of the dead.

Two days, serum laboratory (San Lazaro). Hours, 8 to 12 a. m., 2 to 5.30 p. m., except Sundays. Instruction: Method of preparing serums and vaccine virus; also inoculating against rinderpest, and the use of fungus against locusts.

Two days, office of the secretary, board of health for the Philippine Islands, Potenciana Building. Hours, 8 to 12 a. m., 2 to 5.30 p. m., except Sundays. Instruction: Keeping of records, calculation of vital statistics, preparation and use of reports.

HEALTH PUBLICATIONS.

During the year two health bulletins have been issued from this bureau and the third is now ready for the press. Health bulletin No. 2, on Asiatic cholera, prepared by the chief health inspector, and published August 1, 1903, in English, Spanish, and Pampangan was distributed throughout the islands, its reception was most gratifying, and the good accomplished by it has been repeatedly demonstrated.

Health bulletin No. 3, on The Care of Infants, by Drs. Juan Miciano, Ariston Bautista, Mariano Martin, and Manuel Gomez, has already undergone translation and publication in English, Spanish, Tagalog, Pampangan, Ilocano, and Visayan, and in distribution has exceeded 60,000 copies. This bulletin concerns a matter of vital importance to the people of these islands, viz, infant mortality. It was written, therefore, to reach the people, rather than the medical practitioner, and its reception has been exceedingly gratifying to the board. It is confidently believed that much good will ultimately result from the information thus conveyed to a people who, upon matters of maternity and infancy, are ignorant almost beyond belief.

As has been frequently published by this board, the infant mortality under 1 year alone, in Manila and throughout the islands, is responsible for practically 50 per cent of the total mortality, and is due principally to ignorance, which permits the brutal treatment received by the parturient woman and the subsequent inattention or improper attention received by both mother and child.

PROVINCIAL HEALTH FORMS.

The printing and distribution to the presidents of provincial boards of health and presidents of municipal boards of health, of Board of Health blank forms setting forth the necessary information required by this bureau has already proven advantageous. However, it is frequently difficult to secure the information desired by reason of the fact that many presidents of municipal boards of health are not qualified physicians and it seems difficult for them to understand the character of information desired and how it should be furnished.

DEATH OF MEDICAL INSPECTOR JAMES H. WILLIAMS.

The death of Dr. James H. Williams, medical inspector of this board, by drowning in Lamon Bay on February 10, 1904, cast a gloom over this bureau. Doctor Williams was sent to the province of Tayabas to suppress smallpox, which was assuming an epidemic form, with instructions to canvass the province and perform such vaccinations as appeared to be necessary. While returning from the island of Alabat, where he had been to investigate the smallpox situation, he was caught in a sudden gale and the vessel was capsized and all on board, with the exception of several of the native boatmen, were lost.

DEATH OF CHIEF SANITARY INSPECTOR CIRILO CANIZARES.

Chief Sanitary Inspector Cirilo Canizares, one of the only two Filipino chief sanitary inspectors this board has ever had, died August 21, 1904, after a brief illness.

The faithful and conscientious service rendered by this inspector, particularly during the cholera epidemic, won for him the confidence and respect of all who knew him.

Respectfully submitted.

THOS. R. MARSHALL,
Chief Health Inspector for the Philippine Islands.

The COMMISSIONER OF PUBLIC HEALTH,
Manila, P. I.

REPORT OF PHYSICIAN IN CHARGE OF SAN LAZARO HOSPITALS.

Dr. H. B. Wilkinson, physician in charge of the San Lazaro hospitals, under date of the 1st of September, 1904, makes the following report of the work performed by the several departments of this hospital during the year ending August 31, 1904.

In this report is given a very concise history of the origin, development, and present organization of the hospital, concluding with a more detailed account of the improvements made and the work accomplished during the past twelve months:

The first special leper institution established in Manila was established by the Franciscans as a department of their general hospital, and was located in the district of Concepcion just across the street from the present First Reserve Hospital. This general hospital was constructed by the Franciscan order in 1603 and used in general for all classes of disease until the arrival of about 150 Japanese lepers in 1632, when a separate department was created to care exclusively for leprosy. This conjoined arrangement continued, with the exception of a few years between 1662 and 1681, when, for safety during a threatened invasion by Chinese pirates, the hospital was removed to Quiapo and placed under the management of the local curé. In 1784, on account of the military necessities brought forcibly to the notice of the Spanish authorities during the English invasion in 1762, it was deemed advisable to remove the hospital permanently from Concepcion to a point more distant from the coast defenses. Just two years previously, in 1782, on the expulsion of the Jesuits from the islands by Carlos III, the Spanish Government took possession of the present San Lazaro estate, which at this time, 1784, was turned over to the Franciscans for a leper institution, with the understanding that a portion thereof was to be used as a site for a hospital, while the bulk of the estate was to be rented. The revenues thus received were to be devoted to the support of the lepers.

Accordingly, in 1784, the first regular leper hospital was built, of stone, at a cost of "27,540 pesos, 2 reales, and 2 granos," on the present site of San Lazaro Hospital, and called by its present name. From time to time minor additions and repairs were made, especially after damages from earthquakes and storms, until 1859, when Father Felix Huerta assumed charge of the institution, and is said to have made great improvements. At this time the buildings were enlarged, the extensive stone walls were constructed at a cost of 30,000 pesos, and a stone building erected for the civil guard (probably the present serum laboratory). Father Felix Huerta seems to have been a man of unusual administrative capacity, especially noted for his ability to collect money. It is said that he collected and expended on the institution during twenty-one years of his administration, between 1859 and 1880, about 330,000 pesos. From 1632 until the transfer of San Lazaro Hospital to the United States military authorities, about September 4, 1898, this institution was constantly under the management of the Franciscans, with the exception of the few years between 1662 and 1681, when it was administered by the curé of Quiapo.

On the arrival of the American army in Manila the members of the Franciscan order were living in the front of the two present stone buildings, while the rear one was used for the lepers. On August 12, 1898, the disturbed condition of the country reached such a stage that it was unsafe for these Spaniards to live so far out of town, so on this date they left the hospital and moved into the walled city, notifying the American authorities of the fact on the following day, but continuing to administer the affairs of the institution until about September 4, when they were formally relieved by the United States military authorities.

During the military administration, for the purpose of preventing disease among the soldiers, the women's department of this hospital was opened in the front building formerly occupied by the Spanish friars, where it has remained until the present time. On the transfer from military to civil government in these islands this institution continued unchanged, consisting of only two departments (women's and leper) until March 4, 1903, when the bubonic plague and smallpox hospitals and also the morgue and crematory were united with it under one management. Later, on March 18, the cholera department was added, and we reached our present stage of



FRONT VIEW OF WOMAN'S DEPARTMENT, SAN LAZARO HOSPITAL.



FRONT VIEW OF CONTAGIOUS-DISEASE HOSPITAL.

organization, which is a consolidated hospital consisting of the women's, leper, bubonic plague, smallpox, and cholera departments, to which are united for purposes of administration a morgue, crematory, and disinfecting plant.

This institution is controlled by the board of health for the Philippine Islands and is directly under the supervision of a "physician in charge," who is assisted by 1 American and 2 native doctors, 5 American employees, 6 American trained nurses, and 76 native employees, consisting of nurses, laundresses, cooks, servants, etc.

Foods, medicines, and general supplies are purchased conjointly for the several departments or hospitals and are distributed as conditions require. The employees are all carried on one pay roll and can be assigned to any department or transferred from one to another as circumstances demand. Should the number of patients suddenly increase in one of the hospitals, we can draw on the employees of the others to meet the emergency, and then readjust as soon as conditions return to their normal state. We also attempt to promote the older employees to the higher grade positions and never replace our employees without definite cause.

The general repairs to this institution had been greatly neglected for a number of years past, but I am glad to be able to report that during the past twelve months a great many necessary repairs, improvements, and additions have been made to the grounds, buildings, and general equipment. So that, while two years ago even casual visitors on leaving the institution went away having an unpleasant feeling toward a government which would force unfortunates afflicted with contagious diseases to enter such a place, to-day they show great surprise that such an institution should exist in the East, and not infrequently express their willingness or even desire to be brought here at once should they contract any of the contagious diseases. The service in the wards (and also the food) has been much improved since we have had trained nurses to assist. There have been also some advances made in an effort to grade the grounds, plant trees and grass, and, in general, to beautify the surroundings.

The important improvements and additions made during the past twelve months are as follows:

1. Construction of the new hospital for contagious diseases, including an administration building connected by means of a covered corridor with three other isolated buildings, one for plague, one for cholera, and one for smallpox. The buildings can accommodate about 100 patients, and were opened for occupation on February 11, 1904.
2. The addition of 6 trained nurses.
3. The removal of 3 of the old masonry arches at the side of the main avenue and the construction of a good macadamized road to the new contagious hospital.
4. The filling in and grading of some of the low ground around the buildings.
5. The installing of the main part of a new surface water drainage system, in place of the old estero system.
6. The construction of three new septic tanks to contain the sewage from the several departments.
7. The replacement of all of the old bamboo beds of all the hospitals by newly enameled iron beds, which were bought at a bargain at an army sale.
8. The installation of electric lights throughout the hospitals.
9. The installation of a telephone system connecting the different departments, thereby lessening work, facilitating isolation, and at the same time reducing expense, because it enables us to dispense with two city phones.

With very few exceptions, as may be seen from the above, we have had no trouble in obtaining repairs and improvements to the grounds and buildings and equipment for the wards, but I again call attention to one exception of long standing to this general rule, namely: It has been frequently recommended that more definite separation should be made between sick cattle and human beings with contagious diseases, as the cattle largely increase the flies which tend to spread the diseases; but as yet no results have come from these recommendations.

The work done in the consolidated hospitals during the past twelve months has been as follows:

Remaining in hospital September 1, 1903	281	
Admitted, September 1, 1903, to August 31, 1904	1,302	
		1,583
Discharged during year	1,080	
Died during year	139	
Transferred	17	
Escaped (lepers)	16	
		1,252
Remaining in hospital August 31, 1904		331

The average number treated per day during the year was 297, being, for September, 282; October, 272; November, 288; December, 273; January, 238; February, 293; March, 301; April, 336; May, 335; June, 331; July, 308, and August, 313.

The average cost of subsistence per patient per day in United States currency was, for September, 19 cents; October, 20 cents; November, 22 cents; December, 21 cents; January, 19 cents; February, 19 cents; March, 20 cents; April, 19 cents; May, 18 cents; June, 17 cents; July, 18 cents, and August about 20 cents.

Below will be found a summary of the work done in each of the several departments during the year:

WOMEN'S DEPARTMENT.

An account of the general management and methods of this department can be found in my last report of September 1, 1903. During the year this work has gone on quietly and with few if any changes, so that there is but little to call for special remark. There have been no deaths and very few acute general diseases. One native, register No. 3060, admitted January 30, 1904, was found on admission to have fever, which soon developed into bubonic plague. She was transferred to the plague department and died February 7.

This department was, from July 1, 1903, to April 2, 1904, under the medical supervision of Dr. George D. Fairbanks, and since that date under the supervision of Dr. E. C. Shattuck, with Doctor Ampil as assistant.

There were 74 cases of venereal diseases brought forward from last year, and 1,041 cases admitted during the year, making a total of 1,115 cases treated. Of these 988 cases have been discharged cured, 5 discharged uncured to leave the islands within twenty-four hours, 9 transferred to other hospitals, 7 turned over to the police, and 106 remain in the wards.

	Filipinos.	Japanese.	Others.	Total.
September, 1903.				
Remaining last report	43	29	2	74
Admitted	38	30	3	71
Total	81	59	5	145
Discharged cured	30	33	5	68
Transferred	1	1	0	2
Total	31	31	5	70
Remaining September 30	50	25	0	75
October, 1903.				
Remaining last report	50	25	0	75
Admitted	46	51	8	105
Total	96	76	8	180
Discharged cured	52	47	5	104
Transferred	0	1	0	1
Total	52	48	5	105
Remaining October 31	44	28	3	75
November, 1903.				
Remaining last report	44	28	3	75
Admitted	45	27	9	81
Total	89	55	12	156
Discharged cured	37	32	3	72
Remaining November 30	52	23	9	84
December, 1903.				
Remaining last report	52	23	9	84
Admitted	33	24	0	57
Total	85	47	9	141
Discharged cured	54	38	9	101
Transferred	1	0	0	1
Total	55	38	9	102
Remaining December 31	30	9	0	39

	Filipinos.	Japanese.	Others.	Total.
January, 1904.				
Remaining last report	30	9	0	39
Admitted	48	41	4	93
Total	78	50	4	132
Discharged cured	32	21	0	53
Remaining January 31	46	29	4	79
February, 1904.				
Remaining last report	46	29	4	79
Admitted	40	51	1	92
Total	86	80	5	171
Discharged cured	32	34	1	67
Discharged to leave islands	0	0	2	2
Transferred	1	0	0	1
Total	33	34	3	70
Remaining February 29	53	46	2	101
March, 1904.				
Remaining last report	53	46	2	101
Admitted	30	35	2	67
Total	83	81	4	168
Discharged cured	42	51	2	95
Transferred	1	0	0	1
Total	43	51	2	96
Remaining March 31	40	30	2	72
April, 1904.				
Remaining last report	40	30	2	72
Admitted	71	62	6	139
Total	111	92	8	211
Discharged cured	27	40	5	72
Transferred	3	0	0	3
Total	30	40	5	75
Remaining April 30	81	52	3	136
May, 1904.				
Remaining last report	81	52	3	136
Admitted	45	45	3	93
Total	126	97	6	229
Discharged cured	69	59	4	132
Discharged to leave islands	0	1	0	1
Transferred	0	0	1	1
Total	69	60	5	134
Remaining May 31	57	37	1	95
June, 1904.				
Remaining last report	57	37	1	95
Admitted	35	46	3	84
Total	92	83	4	179
Discharged cured	43	57	2	102
Discharged to leave islands	0	1	0	1
Transferred	1	0	0	1
Total	44	58	2	104
Remaining June 30	48	25	2	75

	Filipinos.	Japanese.	Others.	Total.
July, 1904.				
Remaining last report	48	25	2	75
Admitted	52	33	2	87
Total	100	58	4	162
Discharged, cured	37	33	2	72
Transferred	5	0	0	5
Total	42	33	2	77
Remaining July 31	58	25	2	85
August, 1904.				
Remaining last report	58	25	2	85
Admitted	36	32	4	72
Total	94	57	6	157
Discharged, cured	31	19	0	50
Discharged to leave islands	0	1	0	1
Total	31	20	0	51
Remaining August 31	63	37	6	106

Diagnosis of completed cases.

Month.	Gonorrhea.	Syphilis.	Chancroid.	Gonorrhea and chancroid.	Found not diseased.	Total.
1903.						
September	63	1	1	5	0	70
October	95	1	4	4	1	105
November	61	1	7	1	2	72
December	88	3	4	6	1	102
1904.						
January	41	1	8	3	0	53
February	54	1	3	12	0	70
March	67	4	12	13	0	96
April	46	1	19	9	0	75
May	68	6	28	32	0	134
June	61	5	28	10	0	104
July	45	1	21	10	0	77
August	35	1	6	9	0	51
Total	724	26	141	114	4	1,009

Average number of days cases remained in hospital.

Month.	Patients discharged.	Average days in hospital.	Month.	Patients discharged.	Average days in hospital.
1903.			1904.		
September	70	37	March	96	28
October	105	26	April	75	18
November	72	22	May	134	31
December	102	26	June	104	31
1904.			July	77	34
January	53	32	August	51	33
February	70	32	Total	1,009	28

On comparison of the tables of this report with similar tables of the year previous the following points are observed: The total number of completed cases decreased from 1,098 to 1,009. The number of admissions and discharges during the different months is more regular. The number of women leaving the hospital and islands at their own request and presumably because of dissatisfaction with the sanitary restrictions is reduced from 16 to 5. The number transferred to other hospitals or

the police department, on account of intercurrent diseases or misconduct, falls from 28 to 16. The average number of days spent in the hospital by each case is reduced from 37 last year to 28 this year. It will be noted that all of these changes, as may be seen from a casual inspection of the tables, indicates a tendency toward efficiency of work as well as stability of results.

LEPER DEPARTMENT.

Doctor Mercado continues to do the medical work in this department and the patients have as usual been quiet, cheerful, and contented. The only thing that seems to disturb them is an occasional rumor that they are soon to be transferred to a leper colony on some distant island, for they strenuously object to being removed from the immediate neighborhood of their friends and relatives. During the year a well equipped X ray apparatus has been placed in the leper wards, and its efficacy to some extent tried with both lupus and leprosy. In the former disease, good results are being obtained, but in the latter the results have scarcely been discernable.

We have also replaced all of the old bamboo beds by neat, newly enameled iron beds and substituted electric lights in place of the oil lamps formerly used, both of which changes have greatly improved the appearance as well as increased the comforts of the department. During the past year, while the number of patients has considerably increased, the number of escapes has decreased from 46 reported last year to 16 as per this report. This marked decrease in the number of escapes, while no additional preventive measures have been adopted, would indicate a greater degree of contentment among the patients. Five of the 16 who escaped have returned and have been readmitted. As will be seen, the number of deaths during the year has increased to 26 as compared with 14 reported last year.

Lepers.

Remaining in hospital September 1, 1903	202	
Admitted during the year	73	
		275
Discharged, diagnosis "not leprosy"	5	
Discharged to go to China (Chinese)	2	
Discharged to go to Mindanao	1	
Died during the year	26	
Escaped during the year	16	
		50
Remaining in hospital August 31, 1904		225

Of the 225 patients remaining there are 132 male Filipinos, 91 female Filipinos, 1 male Chinese, and 1 female Spaniard.

CONTAGIOUS-DISEASE SECTION.

This section is composed of the bubonic plague, smallpox, and cholera departments, and occupies the newly-constructed buildings for highly-contagious diseases located on the site of the old detention camp. These buildings were completed early in the year at a cost of about $25,000, United States currency, and were occupied February 11, 1904. The buildings are arranged on the pavilion plan and are substantially constructed of hard material covered with rubberoid. These departments each occupy a separate building, connected with the general administration building by a covered passageway. The administration building accommodates the trained nurses at one end, while in the other end are located the office, storerooms, and kitchen. Patients admitted with contagious diseases, who have been attended by outside physicians, are allowed to retain their private physician when they so desire. The physician in charge personally does the medical work in these departments.

Bubonic plague department.

Month.	Remaining last report.	Admitted.	Died.	Discharged.	Number remaining.
1903.					
September	1	1	1	a 1	
October					
November		1		1	
December					

a Cured.

Bubonic plague department—Continued.

Month.	Remaining last report.	Admitted.	Died.	Discharged.	Number remaining.
1904.					
January		4	2	[a] 1	1
February	1	4	1	[b] 2	2
March	2	2	2	[c] 2	
April		4	3		1
May	1	1	1	[c] 1	
June, July, and August					

[a] Transferred to Chinese hospital. [b] Diagnosis, "not plague." [c] Cured.

As will seen from the above table, 1 case was brought forward from last year and 17 were admitted during the year, making a total of 18. Of these, 3 cases proved not to be plague, while 1 case was transferred to the Chinese hospital, leaving a total of 14 cases of plague actually treated, of which 10 died and 4 recovered, giving a mortality of 71 per cent as compared with 71 per cent of last year. It is only fair to state that practically all of these cases were admitted in a late stage of the disease (after two to five days), there being only 2 exceptions, and many of them were scarcely in bed before death ensued. One of the cases lived fifteen minutes, 1 three hours, and 1 four hours after reaching the hospital, and several only a little longer. All of those who lived long enough were treated with serum and I feel sure that it was the means of saving at least one of the four that recovered and probably benefited others. Serum was usually given subcutaneously but occasionally intravenously in 30 cc. doses. Of the 14 completed cases spoken of above 13 were natives and 1 a Spaniard. The Spaniard recovered.

Smallpox department.

Month.	Remaining last report.	Admitted.	Diagnosed not smallpox.	Died.	Discharged cured.	Number remaining.
1903.						
September	2	1		1	1	1
October	1	2	1		1	1
November	1	3		2	1	1
December	1	2		2		1
1904.						
January	1	1				2
February	2				2	
March		10	1		5	4
April	4	10	1	3	5	5
May	5	17		4	11	7
June	7	5	2	1	8	1
July	1	3			3	1
August	1	4	2	3		

On examination of the above table we find 2 cases brought forward from last year and 58 cases admitted. From this total of 60 cases deduct 7 cases found to be "not smallpox" and there remain 53 completed cases, of which 37 recovered and 16 died, giving a mortality of 30 per cent. With respect to nationality we find the following mortality rate:

Nationality.	Recovered.	Died.	Total.	Mortality.
				Per cent.
Native	24	8	32	25
American	9	5	14	35
English	2	1	3	33
Japanese	1	1	2	50
Spanish	1		1	
Syrian		1	1	100

As compared with last year, this general mortality does not show up well, but a comparison between the two years is valueless, as the proportion of native cases, with its small mortality, is very much less. It will be seen also that even the native death rate is much higher this year, which is accounted for by the fact that we admitted several natives who had remained outside and uncared for until practi-

cally moribund. With a reasonable large number of cases the mortality rate among natives would be very low, not reaching one-half of that which this table shows. Smallpox among Europeans is very serious in this country.

Cholera department.

Month.	Remaining last report.	Admitted.	Diagnosed not cholera.	Died.	Discharged cured.	Number remaining.
1903.						
September	2	69	1	54	14	2
October	2	28	3	23	3	1
November	1	9		6	4	
December		4		3		1
1904.						
January	1	1	1	1		
June		1		1		
July		1	1			
August		1	1			

As will be seen 2 cases were brought forward from last year and 113 admitted. Of this total, 7 seven cases were found to be "not cholera," leaving 108, 87 of which died and 21 recovered, giving a mortality of 80 per cent. This is a much higher death rate than we reported last year, when we treated 385 cases, with a mortality of 68 per cent. It is found with all of these epidemic diseases that as the epidemic goes down and the cases become scattered they necessarily arrive at the hospital much further advanced in the attack and the disease is more fatal. This applies to plague, cholera, and smallpox, and seems to be due partly to the fact that when the number of cases become very low the systematic inspection for them becomes less active, consequently they remain longer in their homes without treatment or attention. A peculiar tendency existed with the cholera cases last fall, when for several weeks practically all patients reaching the convalescent stage were taken with acute lobar pneumonia, from which they invariably died. Several weeks later pneumonia disappeared, and the convalescents all succumbed to nephritis, which followed the acute attack of cholera.

MORGUE AND CREMATORY.

Here we receive the bodies of all persons dying in Manila whose death is supposed to have resulted from one of the contagious diseases, from violence, or from any cause necessitating an autopsy or requiring legal investigation. Also we receive the bodies of paupers to be buried at city expense. The bureau of government laboratories performs all official autopsies, upon the request of the physician in charge when a medical question is involved, or upon the request of the prosecuting attorney when a legal question is at issue. The morgue keeper, who is detailed from the chief sanitary inspectors of the board of health, is personally in charge of the details of the morgue and crematory, and sees that none of the sanitary laws are violated. During the past year 635 bodies were received in the morgue. Of this number 512 were natives, 67 Chinese, 27 Americans, 4 Spaniards, and 26 others.

Number of bodies received at the morgue and causes of death.

Month.	Cholera.	Bubonic plague.	Smallpox.	Leprosy.	Violence.	Other causes.	Total.
1903.							
September	187	5	2	2	3	20	219
October	88	2		1	2	9	102
November	21	2	2	1	4	8	38
December	11	2	3	1	3	15	35
1904.							
January	5	6		3	1	13	28
February	3	4		1	3	9	20
March	1	13	1		1	17	33
April		15	5	5		7	32
May	1	16	5	3	3	12	40
June		6	3	6		18	33
July		10	1		6	15	32
August		7	4	3			23
Total	317	88	26	26	26	152	635

The number of autopsies held during the year was 197; number of bodies cremated, 211; number buried by family, 166; number buried as paupers by city, 258.

REPORT OF THE SANITARY ENGINEER FOR THE PHILIPPINE ISLANDS.

DEPARTMENT OF THE INTERIOR,
BOARD OF HEALTH FOR THE PHILIPPINE ISLANDS,
SANITARY ENGINEERING DIVISION,
Manila, September 6, 1904.

The COMMISSIONER OF PUBLIC HEALTH,
Manila, P. I.

SIR: I have the honor to submit the following report of the sanitary engineering division for the period from September 1, 1903, to August 31, 1904:

As this will be my last annual report as chief of the division, I desire to give a brief history of the division from its beginning.

The sanitary engineer for the Philippine Islands was by law city engineer for Manila. The duties of the latter position required so much of his time that he was unable to give any attention whatever to his sanitary duties.

In November, 1901, I applied to the commissioner of public health for work with the board of health, pointing out at the same time the necessity of having some of the houses in Manila altered and repaired, as well as cleaned.

The chief health inspector had for assistant one medical inspector.

On December 7, 1901, the secretary of the interior, at the request of the commissioner of public health, authorized my appointment as assistant sanitary engineer. The duties of the position were to correct the sanitary faults in the houses in Manila, giving the greatest share of my attention to all houses in which bubonic plague had occurred.

The magnitude of this task alone was realized by none at the time, and by very few since.

Very shortly after taking up the duties, the assistant sanitary engineer pointed out the necessity of condemning and destroying a great number of houses in the city and the consequent need of governmental provision of suitable dwellings for the poor thus made homeless. The suggestion for municipal tenement houses received the cordial support of the superintendent of government laboratories, and through his efforts was finally approved by the board of health. An effort was made to obtain the necessary legislative action, but in spite of repeated efforts, practically nothing has been accomplished other than to prove the feasibility of the plan by one small example.

In October, 1902, an act was passed by the Commission separating the positions of sanitary engineer for the Philippine Islands and city engineer for Manila. Immediately upon the passage of this act I was promoted to the position of sanitary engineer for the Philippine Islands. The duties of this position are to attend to all the sanitary engineering in the Philippine Islands and to such constructions as may be undertaken by the board of health.

Experence had convinced the sanitary engineer that the sanitary faults found in the city were of so fundamental and varied a character that one man could not hope to effect any great improvement, and the city engineer was requested to utilize the engineering force of the city to obtain the necessary data upon which to base scientific general plans for improvement. This he declined to do to any great extent, on the very correct ground that the force allowed to his city office was totally inadequate for the performance of their proper duties.

The lack of accurate, detailed plans has been a great loss to the city, and even at the present day leaves much to be desired. Along some lines much has been accomplished, but the data most needed by this division have been almost wholly neglected. This is not strange since the engineering force of the city has naturally been utilized to collect the data needed for municipal work. No force being allowed this division, the data required to improve systematically the sanitary condition of private properties have not been collected.

In March, 1902, cholera broke out in Manila, and to this is to be ascribed the disproportionate growth of the medical division of the board of health, as compared with the engineering division.

The need for the services of doctors was plain to everybody. Authority was easily obtained from the Commission to request the military authorities to assign doctors to the service of the board of health. The request was made and the military authorities assigned several doctors to the duty. After the worst of the epidemic was over, the board of health requested that the employment of a given number of doctors be authorized, and that the positions be made permanent. Experience has proved the value of the force, and the request was granted; the more readily as the cholera was by no means conquered, and the fear was ever present that the epidemic would break out once more with renewed virulence.

Cholera was killing its hundreds; the conditions which made cholera or any other epidemic more to be dreaded had been overshadowed and almost lost sight of in the fear of the immediate present.

Permanent measures for sanitary improvement had been entirely superceded by temporary measures So far indeed had this been carried that the sanitary engineering division was instructed to suspend repair work in order that all the efforts of the board of health might be concentrated upon the suppression of cholera alone. To get control and keep control of the cholera was the one thought of all. Drugs and disinfectants, shovels and scrubbing brushes were the sanitary agents most readily employed and reckoned of the most value in the emergency. This idea was undoubtedly correct.

Forced into temporary measures by necessity, since that time no effort has been sufficient to turn the energies of the board of health from temporary measures of prevention and cure to well-organized efforts to improve general sanitary conditions, and thus lessen the danger of epidemics. The force received the present trend of its organization under emergency conditions, and is unsuited for obtaining the greatest permanent results. As a consequence of the growth along somewhat corresponding lines, the sanitary engineering division has been entirely neglected, or worse.

Hampered by legislation, opposed by ignorance, disorganized by order, injured by friction, insufficient in personnel, is it to be wondered at that despite a field capable of enormous results comparatively little permanent good has been accomplished.

The improvements obtained in Manila by this division during the past twelve months are summarized in the following tables.

Tabulated statements of certain interesting details are also given.

The work done by the sanitary engineering division outside of Manila is so small that it would not furnish matter for a table.

Statistical report of the repair work of the sanitary engineering division in Manila.

ORDERS ISSUED.

Month.	Sanitary engineer division.	Health district— No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	Total.
1903.									
September		34	16	33	26	15	47	27	198
October		27	11	23	31	69	45	79	285
November		30	12	27	34	18	17	32	170
December		73	6	31	31	26	8	29	204
1904.									
January		52	11	36	23	2	39	35	198
February		11	4	21	16		5	21	78
March	49	3		3	1	2	1	3	62
April	12				1				13
May	73						2		75
June	60								60
July	73		10		8		11	1	103
August	80		19		7		2		108
Total	347	230	89	174	178	132	177	227	1,554

ORDERS OBEYED.

1903.									
September		30	6	28	21	11	40	21	157
October		19	4	22	25	56	30	68	224
November		25	2	19	25	16	17	25	129
December		50	1	21	27	22	7	15	143
1904.									
January		18	1	26	21	2	39	20	127
February		2		1	14		5	12	34
March	49	2		1			1	2	55
April	12				1				13
May	71						2		73
June	42								42
July	32				7		10	1	50
August			10						10
Total	206	146	24	118	141	107	151	164	1,057

Statistical report of the repair work of the sanitary engineering division in Manila—Cont'd.

ORDERS CANCELED.

Month.	Sanitary engineer division.	Health district— No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	Total.
1903.									
September		2	1	5	2	2	6	2	20
October		2		1	4	7	15	1	30
November				8	5	1		1	15
December		11		10	3	1			25
1904.									
January		12		10				5	27
February			1	20				5	26
March				2	1	2			5
April									
May									
June									
July					1				1
August			1		3				4
Total		27	3	56	19	13	21	14	153

ORDERS UNCOMPLETED.

1903.									
September		2	9		3	2	1	4	21
October		6	7		2	6		10	31
November		5	10		4	1		6	26
December		12	5		1	3	1	14	36
1904.									
January		22	10		2			10	44
February		9	3		2			4	18
March		1						1	2
April									
May	2								2
June	18								18
July	41		10				1		52
August	80		8		4		2		94
Total	141	57	62		18	12	5	49	344

PERSONNEL OF THE DIVISION.

Month.	Engineers.	Inspectors.	Clerks.	Translators.	Draftsmen.	Total.
1903.						
September	2	2	1	1		6
October	2	2	1	1		6
November	2	2	1	1	1	7
December	2	2	1	1	1	7
1904.						
January	2	2	1	1	1	7
February	2	2	1	1		6
March	1	2	1	1		5
April	1	1	1	1		4
May	1	1	1	1		4
June	1	1	1	1	1	5
July	1	1	1	1	1	5
August	1	2	1	1		5

PROSECUTIONS FOR FAILURE TO COMPLY WITH SANITARY ORDERS.

	Sanitary engineer division.	Health district— No. 1.	No. 2	No. 3.	No. 4.	No. 5.	No. 6.	No 7.	Total.
Number instituted	40		1		1	1	2	17	62
Number of fines	38		1		1	1	2	17	60
Number not fined	2								2
Sum of fines	₱1,535		₱10		₱20	₱60	₱200	₱140	₱2,265

Statistical report of the repair work of the sanitary engineering division in Manila—Cont'd.

HOUSES CONDEMNED.

	Health district—							
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	Total.
Recommended	60	184	39	44	3	3	5	338
Condemned	44	19	39		3	3	4	112
Destroyed	20		38		1		3	62

Plans for new buildings.—Approved, 473; disapproved, 148.

There were 551 constructions in progress on August 31, 1904, under the direction and supervision of the sanitary engineering division (attention is invited to the "Personnel of the division").

It is to be observed that the sum of the orders obeyed, orders canceled, and orders uncompleted equals the number of orders issued during the year. Many orders issued in the year preceding were completed in the past year, but the records do not properly show these results. For the ensuing year this detail will be a subject of record.

A reference to the table of orders issued each month shows a striking difference between the number of orders issued in the first five and in the last seven months. This is to be accounted for by a change of policy.

In the latter part of February the position of sanitary engineer for the city of Manila was abolished and the sanitary engineer for the Philippine Islands resumed charge of the repair work in Manila. Up to that time orders for repairs were recommended from each station, and after being approved by the sanitary engineer, were issued to the house owners. The district medical inspectors, with commendable zeal, attempted to place their districts in sanitary condition as rapidly as possible. They hastened to get results, and not being trained for the work a great number of incorrect recommendations were made. The sanitary engineer for Manila, with an inadequate force, endeavored to pass on all recommendations and supervise the work after it was ordered. This it was impossible to do properly, and mistakes were frequent, causing much complaint from property owners and occupants.

Immediately after resuming charge of the repair work the sanitary engineer for the Philippine Islands requested that the method of conducting the work be changed so that all repair orders should emanate direct from his office. This request the commissioner of public health granted, issuing orders that thereafter no recommendations for repairs should be furnished from the sanitary stations, but that action from the sanitary stations should be limited to calling the attention of the sanitary engineer to the most insanitary property in the respective districts, with a request that the office of the sanitary engineer take any necessary action.

The efforts of the division were then turned to having orders already issued completed and to getting the records of as much of the past work as possible collected and arranged for ready reference.

Many records have been lost entirely, but such as have been found are now in excellent order and the work of the division is running along very smoothly. It is not infrequent, however, that the loss of some past record places the division in an embarrassing position. Where office copies are missing, and it is found that repair orders have been previously issued against a house, an effort is made to obtain a copy of the original from the property owner. Owing to the suspicion in which the division is held this can not be done in all cases, but in time it is hoped to overcome this and to get the records into fairly complete shape.

During a large part of April the repair work was entirely stopped, the sanitary engineer and the one inspector being at Culion under orders.

Of the 1,554 orders issued 1,057 were complied with in full, 153 were canceled, 344 are still uncompleted.

The quality of the work done in Manila is wretched. It is only a matter of time when it will once more be necessary to have most of these houses again repaired in the same way. It is rare indeed that a property owner really tries to place his property in first-class sanitary condition. Everything is done with the intention of avoiding the consequences of disobeying an order of the board of health, and all the skill and energy shown is developed in doing the poorest and cheapest work which can pass an inspection for completion.

Of the 153 orders canceled, some recommended bad constructions, but many were correct in so far as they went but were not complete enough, and if the repairs had been made as ordered the properties would not have been placed in even such sanitary condition as the poor public facilities of Manila permitted.

It is the intention to take further action on all uncompleted orders and either to enforce or cancel them as may seem best.

It was suggested that each sanitary inspector be detailed in turn to the office of the sanitary engineer to [illegible] of the repair work. It was intended that when a foreman had been rated satisfactory to the sanitary engineer the sanitary inspector [illegible] to his station and should then forward [illegible] in the district. It was hoped by this [illegible] sanitary inspectors sufficiently instructed so that the [illegible] conception of the work. Due [illegible] at the time by the chief health [illegible] practicable in the future it would be [illegible] to make use of a larger portion of [illegible] would be but another step along the wrong [illegible] rapidly with a larger force of [illegible] for the improvement. Reiterated [illegible] repeated, a trained force would be less [illegible]

[illegible] Manila. There are not enough houses in the city to shelter its present population, and because of cheaper rent the worst houses are filled or rented. To destroy one of these houses drives the poor people to seek shelter in places already badly built and already overcrowded. It is therefore with the greatest hesitation that the division recommends the destruction of a shelter of any kind. In spite of all reasons to the contrary in the past year it has recommended that 338 houses be condemned and destroyed. In the majority of instances since March it has added the request that the destruction of the house be postponed until December or January, the end of the rainy season. This would enable the occupants of the old places to have some kind of shelter during the rainy season and would enable the more provident to build small nipa houses in the district of light material. Nipa houses cost very little and few would be unable to build them if [illegible] of little industry were shown.

Municipal tenement houses should have been built long ago to meet this problem, and they would have proved a paying investment to the city as well as a blessing to the poor. The street railroads will undoubtedly help to spread the population and reduce the congestion in the poor districts.

Of the 338 houses recommended for condemnation and destruction, 112 have been condemned, and 62 have been already destroyed.

This by no means covers all the poor houses which have been destroyed during the year. The city engineer has obtained the condemnation and destruction of a much greater number of structural defects, and many owners have destroyed old houses in order to make room for better ones.

A great deal of building is being done in Manila.

All plans for new buildings are now forwarded to this division for examination, and must be approved from a sanitary view point before the city engineer will issue a building permit for the same. In the past more or less slips occurred, some plans were lost, others delayed, and yet others at times received approval without having been approved by the sanitary engineer.

The system is now working smoothly and rapidly, so that no plans are lost, very little delay ever occurs, and every plan is passed on by the sanitary engineer before a building permit is issued.

Four hundred and seventy-three plans for new houses have been approved. Of these 148 were first disapproved for faults in sanitary arrangements and returned to the architect for correction, and in many cases, even after detailed instructions, it has been necessary to reject plans several times, in some few cases to reject them entirely.

Before these plans reach the sanitary engineer they have passed through the office of the city engineer, where an even higher percentage are disapproved for various reasons. This indicates the very inferior quality of the plans submitted.

A design not sufficiently faulty to warrant rejection must receive approval. It is perfectly evident in many cases that with the same expenditure of money a much better house could be built.

The requirements to receive an architect's license should be made higher and more rigid. The present low standard has permitted men unfitted for the work and incapable of learning it to obtain licenses. These men draw plans and supervise construction at a less figure than will men competent to do the work. As a consequence ignorant persons (they are the majority) employ them, not realizing that through incompetence these uneducated and ignorant architects cost much more in the end than would higher class men. The standard must not be placed too high, for there are scarce 6 competent architects in business in Manila.

Even after a satisfactory plan is accepted the continual supervision of inspectors is needed to enforce the construction in accordance with the essential details which governed acceptance of the plan. Any number of instances could be cited to illustrate this point. Two exceptionally flagrant cases which have recently come to my notice will serve.

A permit was obtained to erect a stable in the rear of a long row of houses. Investigation showed that instead of erecting a one-story stable a small two-story house had been built.

In another case the street face of a house had been built according to plan while the interior arrangement had been so completely changed that it was unrecognizable. The house from being thoroughly well planned had been changed to an idiotic mess, contrary to good sense, good taste, and good law.

The building department of Manila has not sufficient inspectors to attend properly to this work, nor are the salaries paid sufficient to obtain the class of men desirable for the positions. More assistance should be authorized, and at higher salaries.

To enforce compliance with orders issued through this division it has been necessary in a number of cases to institute legal proceedings in the court. Strange to say, these records appear to be less complete than any other. From January on the record is fairly complete and shows 47 cases prosecuted. In 45 of these fines were imposed, 1 was dismissed at the request of the sanitary engineer, and 1 through default, the time for which the case was set having been misunderstood in the sanitary engineering division.

Previous to January records have been found of only 15 cases, in all of which fines were imposed. This record is known to be very incomplete. Fines to the amount of ₱2,265 were imposed in these known cases. It is hoped, through the aid of the prosecuting attorney's office and the municipal court records, to make this record complete.

Much of the success attained in the repair work is due to the cordial and able support received from the prosecuting attorney and his assistants.

During July and August the temporary employment of a draftsman was authorized, and during this period the plans of authorized constructions were revised and plans of new designs were drawn up for submission to the board of health for approval. Specifications were drawn to be attached to each design.

The purpose in making these plans and specifications was to obtain authority from the board of health for sanitary but cheaper constructions than those then authorized. Blueprints are now given to property owners to aid them in understanding orders received. A good effect is already to be observed on the work.

Owing to the fact that no engineering assistance is allowed to the division it has been impossible to obtain sufficiently accurate data on which to base orders for repairs in some of the largest and most insanitary property in the city. It has therefore been thought best to rely on enforceing a certain degree of cleanliness, rather than put the owners to heavy expenses for repairs which could not be guaranteed to place the properties in sanitary condition.

Up to the 1st of January the pail conservancy system was subordinate to the sanitary engineering division and increased the duties of the sanitary engineer, Manila, to a considerable extent. The system and all its records were transferred to the municipal government January 1, 1904, and the superintendent will undoubtedly render a report to the city engineer covering the entire year.

In April, by order of the secretary of the interior, the sanitary engineer for the Philippine Islands accompanied the commissioner of public health to the island of Culion to investigate the possible obtainable water supply for the town of Culion and to serve on the committee appointed to select a new site for the leper colony.

The sanitary inspector detailed to the sanitary engineering division accompanied the sanitary engineer to assist him in collecting any desired engineering data. While absent on this trip the repair work in Manila ceased, and upon returning to the city much complaint was received from those who had been under orders to make repairs and had not been able to get explanations of such points as they did not understand. Much of this complaint was made for effect, but the effect on the authority for the division was felt for a couple of months afterwards.

It was intended that the work at Culion should be under the direction of the sanitary engineer, but owing to the lack of assistance in the division and to the confining nature of his duties in Manila he has been unable to attend to the matter and it has been tacitly removed from his charge.

A number of minor matters have been attended to during the year, such as a small piece of filling at San Lazaro, plans and estimates for proposed provincial hospitals, and investigation at Cebu, instructing presidents of provincial boards of health in matters of sanitation, the rearrangement of the drainage system at Bilibid, and matters of a similar character.

Under the law it is the duty of the chief of the sanitary engineering division to attend to the water supplies, the drainage, and, in general, the sanitary arrangements of over 7,000,000 people distributed throughout these islands.

His division consists of one clerk, one interpreter, and one sanitary inspector detailed from the medical division, and he desires herein to express his appreciation of their faithful and earnest efforts to promote the efficiency of the division.

In the last appropriation an increase of one Filipino draftsman was allowed, and within the last three weeks another sanitary inspector has been detailed for temporary duty. The

division will need some further increase before it will be able to cover the entire field of its duties.

In making further appointments to this division it might possibly avoid confusion to define which position ranks as chief of the sanitary engineering division.

The sanitary engineer for the Philippine Islands has no recommendations to make other than those contained in the report of last year and in his estimate for funds submitted in December, 1903.

Very respectfully,

H. D OSGOOD,
Sanitary Engineer for the Philippine Islands.

REPORT OF DISBURSING OFFICER, BUREAU OF PUBLIC HEALTH, FROM SEPTEMBER 1, 1903, TO AUGUST 31, 1904.

MANILA, P. I., *September 7, 1904.*

The COMMISSIONER OF PUBLIC HEALTH,
Manila, P. I.

SIR: I have the honor to submit the following statement showing the disbursements made for account of the board of health for the Philippine Islands by this office during the period from September 1, 1903, to August 31, 1904:

[Values in Philippine currency.]

	Disbursements made chargeable to				Total disbursements.
	Fiscal year 1902.	Fiscal year 1903.	Fiscal year 1904.	Fiscal year 1905.	
Salaries and wages		1,678.62	323,295.18	32,687.21	357,661.01
Support of hospitals, plants, and stations		1,095.08	118,144.66	11,289.55	131,229.29
Suppression and extermination of epidemic diseases and pests	1,025.41	4,647.93	18,619.02	1,175.77	25,468.13
Transportation	48.70	334.33	18,407.58	941.04	19,731.65
Contingent expenses		15.00	4,424.54	111.30	4,550.84
Public works		577.15	4,638.00		5,215.15
Installation of pail system:					
Contingent expenses		42,903.10	24,882.05		67,785.45
Salaries and wages			26,461.61		36,461.61
Total	1,074.11	51,251.51	548,872.64	46,907.87	648,106.13

Very respectfully,

MILLER JOBLIN,
Disbursing Officer, Board of Health.

REPORT OF CASHIER OF BOARD OF HEALTH FROM SEPTEMBER 1, 1903, TO AUGUST 31, 1904.

MANILA, P. I., *September 9, 1904.*

The COMMISSIONER OF PUBLIC HEALTH,
Manila, P. I.

SIR: I have the honor to hand you the next attached four statements showing in detail the total amounts received by the cashier, board of health, during the period from September 1, 1903, to August 31, 1904, viz: Exhibit A, Table showing number of animals inspected by veterinary division and amounts collected therefor and deposited with the treasurer of the Philippine Islands, also those inspected gratis for the civil and military governments; Exhibit B, Table showing number of burial and other permits issued and the amounts collected therefor and deposited with the city assessor and collector; Exhibit C, Table showing number of units of vaccina virus and bottles of serums sold and amounts collected therefor and deposited with the bureau of government laboratories; Exhibit D, Miscellaneous funds collected by the cashier, board of health, and deposited with the treasurer of the Philippine Islands.

Very respectfully,

MILLER JOBLIN,
Cashier, Board of Health.

EXHIBIT A.—*Table showing number of animals inspected by the veterinary division and amounts collected therefor and deposited with the treasurer of the Philippine Islands; also those inspected gratis for the civil and military governments during the year September 1, 1903, to August 31, 1904, inclusive.*

Month.	Cattle.		Carabaos.		Horses.		
	Paid for.	Gratis.[a]	Paid for.	Gratis.[a]	Paid for.	Gratis.[a]	Gratis.[b]
September	4,111		58	424	232		
October	2,716	6	38	255	175		
November	4,470	35	48	617	330		298
December	3,557	10	28	294	293		73
January	3,731	29	35	202	175		
February	3,499	19	60	3	273		102
March	2,950		57		212		21
April	2,648	10	67	271	316	21	204
May	2,984	39	31	189	249	1	
June	2,617	198	32	173	271	9	
July	2,646	205	50	789	149		
August	2,970	69	23	247	128	214	3
Total	38,899	620	527	3,464	2,803	245	701

Month.	Hogs.		Sheep (paid for).	Goats (paid for).	Other animals.		Amount collected.	
	Paid for.	Gratis.[a]			Paid for.	Gratis.[a]	Local currency.	Philippine currency.
September	3,217		110	58	11		104.82	1,355.30
October	3,500		115	64	11		111.29	1,027.00
November	3,527	4	250	60	7		105.11	1,549.40
December	3,162		168	39	10		930.25	594.50
January	3,718		60	32	4		193.43	1,154.10
February	3,908		9	47	12		103.29	1,360.90
March	3,920		11	79	6		123.75	1,124.70
April	4,591		9	34	10		113.98	1,222.20
May	3,937		26	41	13	2	32.38	1,242.60
June	3,738		16	34	14		57.20	1,144.60
July	4,178		9	56	5	7		1,131.00
August	4,149		5	40	18	11		1,162.30
Total	45,475	4	818	584	121	20	1,884.50	14,017.60

[a] For civil government.
[b] For military government.

EXHIBIT B.—*Table showing number of burial and other permits issued by the burial division and the amounts collected therefor and deposited with the city assessor and collector during the year September 1, 1903, to August 31, 1904, inclusive.*

Month.	Burial.	Adult's niches.		Children's niches.		Exhumation.		Prorogues.		Transcripts from records.			Amounts collected.	
		Paid for.	Gratis.	Paid for.	Gratis.	Paid for.	Gratis.	Adult.	Children.	Paid for.	Gratis.	Transit.	Local currency.	Philippine currency.
September	1,061	22		11		17		2		4			900.02	782.00
October	1,130	25		14		60		3		6			872.28	1,223.40
November	920	13		11		47		1		4		1	716.38	717.80
December	858	15		9		27				1		5	900.00	388.50
January	761	9	1	7		30		4		4			361.25	669.70
February	660	21		8		13		2		5		1	323.95	976.10
March	710	24		2		27		2		6		1	501.05	881.10
April	740	14	3	7		45		1	2	3	1		305.25	960.50
May	726	13		4		36	1	1	1	3		1	187.12	883.90
June	763	14		10		29		1		3			204.00	985.30
July	854	18		10		37				5			148.76	1,230.00
August	1,028	14		9		50		1		6			106.70	1,298.80
Total	12,211	201	4	102		418	1	18	3	50	1	9	5,626.26	11,036.10

EXHIBIT C.—*Table showing number of units of vaccine virus and bottles of serum sold by the bureau of health and amounts collected therefor and deposited with the bureau of government laboratories during the year September 1, 1903, to August 31, 1904, inclusive.*

Month.	U. S. Army.	U. S. Navy.	Bureau of prisons.		Miscellaneous.		Total.		Amounts collected.	
			Vaccine virus.	Bottles serum.	Vaccine virus.	Bottles serum.	Vaccine virus.	Bottles serum.	Local currency.	Philippine currency.
September	3,940				265		4,205		14.40	118.20
October	4,905		2,100	59			7,005	59		375.34
November		500			70		570			19.20
December	5,470				50		5,520			167.10
January	3,180	500			95	2	3,775	2	2.40	116.10
February	3,030				60	4	3,090	4	4.80	94.50
March	3,050	25			375	1	3,450	1		111.66
April										
May		(a)								12.50
June										
July										
August										
Total.	23,575	1,025	2,100	59	915	7	27,615	66	21.60	1,014.60

(a) Collection.

EXHIBIT D.—*Miscellaneous funds collected by cashier, board of health, and deposited with treasurer of the Philippine Islands during the year September 1, 1903, to August 31, 1904, inclusive.*

Month.	Board at San Lazaro Hospital of officers and employees of that institution (Philippine currency).	Sale of public civil property by authority of secretary of the interior (Philippine currency).	Reimbursement for rat traps lost by rat catchers.		Miscellaneous money left at San Lazaro Hospital by deceased patients.		Total.	
			Local currency.	Philippine currency.	Local currency.	Philippine currency.	Local currency.	Philippine currency.
September	48.00	44.00						92.00
October	60.00							60.00
November								
December	48.00							48.00
January			31.50	31.30			31.50	31.30
February	928.00				31.06	0.04	31.06	928.04
March	120.00	466.00						586.00
April	120.00							120.00
May								
June								
July								
August								
Total	1,324.00	510.00	31.50	31.30	31.06	.04	62.56	1,865.34

REPORT OF THE CHIEF OF THE VETERINARY DIVISION FROM SEPTEMBER 1, 1903, TO AUGUST 31, 1904.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PUBLIC HEALTH FOR PHILIPPINES,
VETERINARY DIVISION,
Manila, P. I., September 15, 1904.

SIR: By a resolution of the Philippine Commission, dated July 27, 1903, a veterinary division under the control of the board of health was authorized for the purpose of investigating and suppressing diseases of carabao, cattle, horses, and other animals in the Archipelago, such as rinderpest, surra, glanders, and other contagious diseases.

Efforts were immediately made to obtain veterinarians from the States, and inoculators were also employed for this purpose. The first veterinarian so employed reported in September, 1903.

The veterinary department of the board of health has been in existence since April 22, 1899, being organized by an order of the provost-marshal-general. Its duties were to

inspect all animals arriving in Manila; the inspection of animals slaughtered in the matadero for food purposes; the care and treatment of public animals, and inspection of public and private stables with reference to their sanitary condition and the health of the animals.

The force of the department at that time was one veterinarian and three native inspectors.

The number of animals inspected on arrival in Manila and the fees collected for same have shown an annual increase. The care of public animals and inspection of stables throughout the city have received dilligent attention. The general health of public and private animals has improved.

Surra, a disease which has made its appearance since the American occupation, is still present and is the cause of a large number of deaths among horses. It is also found in carabao and cattle.

Glanders (farcy), which is always present, is under good control, few cases being noticed now upon the streets, and a less number reported than in former years.

Epizootic lymphangitis, a contagious disease, closely resembling farcy, is quite prevalent, but this condition is readily amenable to treatment and the death rate is very small.

The appended table of inspections, condemnations, and fees collected clearly shows the work of the division in Manila.

In reference to fees collected for the inspection of animals arriving in Manila, it seems that the original intention was that fees should be collected solely for the inspection of animals slaughtered for food purposes. No provision was made for the inspection of or the collection of fees for animals shipped to the provinces.

Owing to the changed conditions, this work is increasing yearly, all inspections so made being at the request of owners shipping cattle to other points for work or slaughter, and for which no fee is charged.

Since all the work of the board of health, except inspections made by the veterinary division, is performed gratuitously, and further, since it is the intention of the municipality to institute stockyards, wherein all animals arriving in the city shall be entered, it is recommended that the fees collected for inspection be abolished. However, it is not recommended that the inspections be abolished, but that they be continued under the same conditions as at the present, and that all live stock shipped from Manila to provincial ports be subject to the same inspection, and that a certificate of health be issued by the veterinary division to accompany such stock.

The veterinary division was actually established by a resolution of the Philippine Commission under the date of February 27, 1904, to take effect April 1, 1904, and was to consist of a chief veterinarian, 4 veterinarians, 4 emergency veterinarians, 15 American inoculators, and 5 native inoculators.

The positions of veterinarians were all filled, with the exception of 2 emergency veterinarians, before the first of the year, 1 being appointed from veterinarians in the islands and 5 coming from the States.

In July, 1903, the chief veterinarian was sent to Shanghai to superintend the inoculation and inspection of the carabao bought at that point by the civil government, and did not return until May 12, 1904.

Up to April 1, 1904, the supervision of the work of the veterinarians and inoculators was under the director of the serum laboratories. Much of the work done was in connection with the carabao shipped from Shanghai. Other diseases and conditions appeared in the various herds of carabao distributed in the islands, and the losses from these causes were larger than from rinderpest, surra being the most fatal.

Since the above date the veterinarians of the division have inoculated large numbers of carabao in the provinces with antirinderpest serum. The force could have accomplished much more if the supply of serum had been larger.

The appended table shows the number of inoculations and the provinces in which the work was done.

The division also examined over 2,000 animals for surra, finding 112 positive cases. This includes 1,042 carabao in Manila, of which 40 were found positive.

Attention is invited to the special reports by veterinarians of this division.

Very respectfully,

JOHN G. SLEE,
Chief, Veterinary Division.

The COMMISSIONER OF PUBLIC HEALTH,
Manila, P. I.

Inspections of animals on arrival in Manila.

Month.	Number of inspections.	Cattle.	Carabaos.	Horses.	Hogs.
September	463	4,111	482	247	3,232
October	437	2,716	293	175	3,500
November	365	4,505	665	628	3,331
December	327	3,567	322	366	3,462
January	284	3,760	237	175	3,718
February	360	3,518	63	375	3,008
March	352	2,950	57	233	3,920
April	427	2,658	338	541	4,391
May	396	3,023	220	250	3,947
June	363	2,815	205	280	3,738
July	473	2,851	839	149	4,178
August	517	3,039	270	345	4,149
Total	4,764	39,513	3,991	3,764	45,474

Month.	Sheep.	Goats.	Other animals.	Total	Philippine currency.	Spanish-Filipino currency.
						Pts.
September	140	58	11	8,281	₱1,355.30	104.82
October	115	64	11	6,874	1,027.00	111.29
November	250	60	7	9,446	1,549.40	105.11
December	168	57	10	7,952	594.50	939.25
January	60	32	4	7,986	1,154.10	103.43
February	9	47	12	7,932	1,309.90	103.29
March	11	79	6	7,256	1,124.70	123.75
April	9	34	10	7,981	1,222.20	113.98
May	26	41	15	7,522	1,242.60	32.36
June	16	34	14	7,102	1,144.60	57.25
July	9	56	12	8,094	1,131.00	
August	5	40	29	7,877	1,162.30	
Total	818	662	141	94,303	14,017.60	1,884.53

Animals condemned upon inspection.

Month.	Carabaos.	Condemned and cremated.			Total.
		Horses for surra.	Horses for glanders.	Other animals.	
September			21	23	44
October			9	38	47
November		1	7	58	66
December		21	23	95	139
January	88	1	18	20	39
February	15	1	21	33	55
March		9	15	25	49
April		5	6	24	35
May		4	13	46	63
June			5		5
July			18	7	25
August			9	6	15
Total	103	42	165	375	582

Animals slaughtered and condemned in matadero.

Month.	Cattle.	Hogs.	Sheep.	Goats.	Total.	Condemned and cremated.		Total.
						Cattle.	Hogs.	
September	2,681	5,408	159		8,248	15	22	37
October	2,412	5,663	125		8,200	8	16	24
November	2,124	5,040	81		7,245	5	12	17
December	2,511	5,363	123		7,997	13	15	28
January	2,384	5,256	138		7,778	1	13	14
February	2,049	5,209	22		7,280	6	22	28
March	2,001	4,952	4	1	6,958	2	13	15
April	2,130	5,044	1	5	7,180	3	28	31
May	1,895	5,376	16		7,287	5	21	26
June	1,935	4,844	7	6	6,792	7	22	29
July	2,102	5,248	1	9	7,360		18	18
August	2,053	4,911		10	6,974	3	16	19
Total	26,277	62,314	677	31	89,299	68	218	286

Inoculations against rinderpest, from March 1 to August 31, 1904.

Province.	Inoculations.		Total.	Deaths.		Total.
	Serum.	Simul.		Serum.	Simul.	
Ambos Camarines	74	377	451			
Bulacan	48	364	412		30	30
Cebu	243	106	349	9	33	42
Cagayan	48	2,257	2,305		48	48
Burias (government)	1,173	18	1,191			
Negros (island)	632		632			
Pampanga	1,044		1,044			
Tarlac	560		560			
Panay (island)	381	289	670	2	21	23
Benguet road	250		250	1		1
Union	1,455		1,455			
Total	5,908	3,411	9,319	12	132	144

A PRELIMINARY REPORT ON THE PRESENCE OF ANTHRAX IN THE PHILIPPINE ISLANDS, BY R. H. McMULLEN, D. V. S., VETERINARIAN, BOARD OF HEALTH.

History.—Anthrax is the most ancient of the infectious diseases of animals. No doubt can be entertained of its antiquity, as under various names it has been referred to in the oldest records. Moses mentions it as the "sixth plague of Egypt," and speaks of its transmission to man. Previous to our era it is described by Homer, Ovid, Plutarch, and Lucretius. The Arabians knew it as "Persian fire." Several epizootics occurred in Italy in the sixteenth century. Gloss-anthrax appeared in France in 1662, and later it extended all over that country. Subsequently, in an epizootic form, it existed in Germany, Poland, Finland, and Russia.

In 1855 Pollender made it known that in 1849 he found large numbers of fine sticks in the blood of cattle attacked by anthrax. This fact was also noted in 1850 by Davaine who, in 1863, recognized that these elements were bacteria, and was the first to apply the "germ theory" to anthrax. This investigator's determination thus marked a wonderful step toward the advancement of medical science, as previous to that time the cause of anthrax and the nature of all contagious diseases were unknown.

In January, 1904, the writer was sent to the pueblo of Tagudin, province of Ilocos Sur, Luzon, to investigate reports of a disease which prevailed among the animals in that locality. The outbreaks antedated American occupation, and occurred at the conclusion of the rainy season each year. The disease showed the most virulency at the beginning of each outbreak, and proved fatal in from two to three days. Carabao, cattle, and horses succumbed. A microscopical examination of the blood of the viscera revealed the bacillus anthracis. Cultures were made at the government laboratories, Manila.

The attention of the writer was also called to the death, after a sickness of two hours, of 7 suckling pigs. The mother remained healthy. The statement in this instance of death by anthrax must be taken with an amount of reserve, because a microscopical examination of the blood was not made. The mother had access to anthrax blood and meat.

A dozen dogs feasted upon the carcas of a carabao that had died of anthrax, and they all died in a few hours. No autopsies were held.

In April, 1904, the death of 2 mules from anthrax was reported at Camp Wallace, Union, by Veterinarian Lusk, Second Cavalry, U. S. Army. These animals were of a pack train which plied between Camp Wallace and Benguet, and the infection was without doubt picked up along the trail.

Cause.—Anthrax is caused, and determined, by the presence of a microscopic organism known as the bacillus anthracis. The bacilli appear in the living organism in the form of straight rods. Their dimensions vary according to the species of animals, also the individuals in which they are found. They are larger than most other bacilli, and in general their length is nearly double the diameter of a red blood corpuscle. Examined by straining, they appear in joints, the extremities of the elements being slightly larger than the body, and are marked by a central depression, the concavities of which form a free oval space when the rods are united end to end. A series of rods thus arranged form a figure which somewhat resembles bamboo.

Reproduction takes place by growth in their length, and by transverse segmentation. Outside of the body the bacilli are transformed into filaments, and may attain one hundred times the length of the primary element. At determined spaces are noted ovoid corpuscles, the spores, which are freed by the destruction of the covering membrane of the filaments.

The bacilli may be cultivated in various media. Upon gelatin the cultures show a flaky aspect, and upon examination under the microscope the bacilli appear as an irregular packing of filaments in an arrangement resembling twisted rope.

Biological properties of the bacilli.—The bacilli vegetate in the blood, the plasma and the serum, the aqueous humor, in milk, animal matter, and excretions mixed with the soil. The bacillus is acrobic, its development depending upon the presence of oxygen. The growth of the bacillus ceases below 12° C. and above 45° C. Light hinders the development of, and putrefaction kills, the bacillus. It also shows very little resistance to heat and drying.

The reproduction of the bacilli outside of the organism is performed by lengthening, and the appearance in their protoplasm of small corpuscles which soon constitute spores. The spore in turn gives birth to the bacillus by sprouting, after which the spore disappears.

Biological properties of the spores.—Spores possess remarkable vitality; they are resistant to the temperature of boiling water, intense cold, and years of desiccation.

Distribution and sources of infection.—Anthrax infection is found in the five grand divisions of the earth's surface, and in the following countries: Germany, France, Russia, Austria, Switzerland, Italy, England, Spain, Turkey, Australia, United States (the lower Mississippi Valley and elsewhere), the East Indies, Persia, China, and the Philippine Islands.

Anthrax is most common in the ox, and the different domesticated species may be classed according to their respectivity in the following order: Ox, sheep, carabao, goat, horse, cat, dog, and pig.

Anthrax usually appears as an infectious, enzootic disease, stationary in some districts. Its development is favored by a certain composition of soil, and conditions of moisture and temperature. It exists in localities with soil rich in organic matter, in regions of a swampy character, with impervious subsoil, and in tracts of lowlands exposed to submersion.

The infected lands about Tagudin are low, and are located between the rivers and the adjacent highlands. These areas abound in organic matter deposited by the inundations of the rainy season. After the floods subside all depressions are left covered with stagnant pools. The hot, dry season follows, and the smaller streams and pools disappear. Animals then graze upon the pastures and vegetation of the lowlands from which the water has subsided.

Before the advent of the Americans no effort to incinerate or bury the carcasses was made.

The temperature also plays an important part. An elevated temperature after heavy rains is most favorable for the development of the bacilli.

Anthrax is seldom conveyed directly from a diseased to a healthy animal, but rather through the agency of the secretions or the excretions of a sick animal, or by the intermediation of man, insects, or soiled utensils. It was formerly thought that the disease was of miasmatic origin. The bacilli gain entrance into the living organism by the alimentary tract, the lungs, or the skin. The most common form of infection is by the alimentary tract, and is usually produced by the ingestion of spores with food or drink. The elements penetrate the mucous membrane of the intestines, and thus enter the circulation. The most general source of infection is by fodder from ground contaminated by the burial of anthrax carcasses.

Cutaneous anthrax does not occur nearly as frequently as the intestinal variety. In this form the bacilli gain access to the organism through wounds in the skin.

The rarest form is by inhalation of the spores.

Symptoms.—The symptomatology varies with the species, the individual, and according as the disease begins, in the intestines, the lungs, or the skin; also with the severity of the attack. The invasion is always sudden, the development rapid, and death usually occurs in from one hour to several days.

In the apoplectiform variety the symptoms are those of cerebral apoplexy. The animals suddenly stagger and fall, and bloody liquids exude from the natural orifices. Death follows in from one to two hours. They often die while at their meals, during work, or are found dead in the stable or pasture.

The acute type has a duration of from twelve hours to two days, and is usually ushered in by an elevated temperature. Feeding and rumination cease, the extremities are cold, the flanks contracted; the animal is dull, weak, and constipated, and tenesmus is present. These symptoms are followed by uneasiness, the breathing becomes labored, the tongue is protruded, gait staggering, the animal stamps and bellows, and convulsions are succeeded by death.

The subacute form is more prolonged, lasting three to seven days. The clinical symptoms are nearly similar to those of the acute form, though better defined and less rapid. Remissions are frequent.

In cutaneous anthrax, which is observed in the horse and ox, the tumors are circumscribed, hard, hot, and painful at the start, and later they become cold, gangrenous, and insensible to pain. Cases of recovery are more numerous than in the other forms.

Anthrax tumors are observed in the mouth, larynx, and pharynx, and in the rectum. This is the form usually seen in the pig (gloss anthrax). The horse and ox show the acute, the apoplectiform variety, and the anthrax tumors most frequently. In sheep we note the apoplectiform variety. In the dog, anthrax tumors.

Diagnosis.—In the acute and subacute forms the diagnosis is based on the finding of the bacilli and on the infectious character of the disease. Quite often the bacteriological examination of the blood gives a negative result, because the bacilli may be located in the internal organs; it is therefore advisable to obtain blood from the liver by means of the trocar. The bacilli are less numerous in the blood in proportion to the more rapid course of the infection.

During life the diagnosis is somewhat difficult. The symptoms may be confounded with those of pulmonary or cerebral congestion, poisoning, or septicæmia. Anthrax is generally recognized only after death. Miscroscopical observations are not alone sufficient. The diagnosis requires a search for the bacillus. Inoculation is another means of diagnosis.

Morbid anatomy and pathology.—The principal alterations are observed as follows: Hemorrhages in nearly all the organs; sero-gelatinous and hemorrhagic infiltrations of the subcutaneous, submucous, and subserous connective tissue; tumefaction of the spleen, and parenchymatous inflammation of the liver and kidneys; dark, tarry condition of the blood; the presence of the bacilli in all the tissues and especially in the blood of the viscera.

The cutaneous vessels are obstructed with dark blood. The derma contains hemorrhagic centers. In anthrax due to inoculation, hard nodules, varying in size, are seen on the skin, and their tissues are necrosed.

The subcutaneous connective tissues show hemorrhages and infiltration of a yellowish jelly-like serum. This is well marked in the pharyngeal and laryngeal regions.

The muscles have a yellowish or dark-red shade and are friable. Intramuscular hemorrhages are numerous.

The spleen is hypertrophied; the pulp is softened, dark, and semiliquid, and gravitates in the distended capsule.

The liver and kidneys are hyperæmic and show many hemorrhages.

The lymphatic ganglia are œdematous and marked by hemorrhages.

The mucous membrane of the stomach and intestines is the seat of hemorrhages. The intestinal contents are bloody.

The lungs are congested; the brain shows hemorrhagic centers; and the genitourinary organs contain hemorrhagic areas. The urine is rarely bloody.

The heart and the large veins are filled with dark blood. The blood is noncoagulable, dark red, and as if varnished on its surface.

The cadavers are much bloated soon after death and decomposition sets in quickly. The natural orifices give exit to bloody mucous. The rectum is often prolapsed. These various alterations may be wanting in the apoplectiform variety.

Treatment.—The prophylactic treatment is the most important. It is necessary to destroy the carcass and disinfect the surroundings thoroughly. Cadavers should be burned or buried unopened at a depth of 6 feet with a liberal sprinkling of lime both under and over the carcasses. Burial places should be located at a reasonable distance from any running water.

Prevention.—Improvements in the soil, such as drainage, and the preventing of animals from grazing on infected areas contribute to the disappearance of the disease.

Animals which recover from anthrax possess an immunity. This gave rise to the discovery by Pasteur in 1881 of means by which to create immunity artificially, which is accomplished by inoculating with the bacillud deprived of part of its virulence.

Anthrax in man (malignant pustule) usually has as a starting point, a wound, and secondarily, anthrax fever (butchers', tanners', veterinarians'). Less frequent the infection is by inhalation (wool sorters' disease). Malignant pustule generally terminates fatally.

SPECIAL REPORT ON SWINE PLAGUE AND HOG CHOLERA, BY MURRAY J. MYERS, D. V. M.

INTRODUCTORY.

These two diseases resemble each other very closely in their symptoms, and it requires an examination of the internal organs after the animal's death, and in many cases a microscopical study, to clearly distinguish them. The difficulty of distinguishing between the two diseases is therefore of no great consequence in the practical work of controlling them. It is more important to know that one or the other of these diseases is present because the knowledge leads at once to the adoption of measures applicable to the treatment of infectious diseases. Therefore I shall speak of them as one and the same disease.

HISTORY.

During the month of April last there was reported a disease among hogs in the province of Bulacan which in all probability, from the description, was hog cholera or swine plague. If I remember correctly there were 400 head of hogs reported to have died during the four months previous to April last. This particular outbreak seems to have subsided after about four months' duration.

Hog cholera and swine plague are supposed to have been introduced into the United States about the year 1858 from continental Europe, while in the latter country a disease resembling our hog cholera of to-day is spoken of in ancient literature.

CAUSE.

Both hog cholera and swine plague are caused by bacteria which have now been so carefully studied that they may be easily identified. The germs of hog cholera are slightly larger and longer than those of swine plague, are more resistant to climatic conditions and other influences that affect low forms of life; they obtain entrance to the body through food, water, and air; young pigs are especially susceptible and many die, when older ones have a mild attack or escape altogether; the intestines are the primary seat of the infection. The disease of hog cholera is more easily communicated than swine plague. The germs of swine plague are believed to gain entrance to the body mainly through the inspired air. The older and fatter hogs give the greater mortality. The lungs are the primary seat of infection. The swine plague germs are not nearly so resistant to climatic conditions, and are very delicate and easily destroyed.

Hog cholera is easily produced by exposing well hogs to diseased ones, by feeding to well swine the carcasses of hogs that died from the disease, and by hypodermic injections of cultures of the germ. Both diseases may be produced by injecting cultures of their respective germs directly into the blood stream.

SYMPTOMS.

The symptoms of the two diseases are alike. They vary according to the severity of the attack. Often the hog will be found dead before it is known to be ailing, while in chronic cases it may be sick for two or three weeks. The condition of the eyes give early indications of the disease. The mucous membranes become reddened and the lids gummy and glued together. The pigs appear chilly and lie in the sun when they would ordinarily remain in the shade. They will hunt for litter under which to secrete themselves; the appetite is lost and diarrhea is developed. In the earliest stages constipation may be present. The attack may or may not be attended with a cough, which may be frequent or only when the animal gets up from its bed. In breathing, the ribs seem to remain quiet and a quick jerk is seen in the flank at each expiration. Lameness in one or more limbs and a stiffness of the back may be noticed. In swine plague the respiratory symptoms are early developed and more characteristic than in hog cholera. A high temperature is always present, which may reach 106 to 108° F. The skin is often congested and red on the inner surface of the legs and around the abdomen. The color varies from a pinkish red to a very dark red. Thickening and cracking of the ears and scabs on the skin may be observed.

The symptoms of swine plague in many cases are identical with those of hog cholera. The course of the disease varies from a few hours to a day or three weeks. I have in mind a herd of hogs that I visited in the United States, containing 90 head, 89 of which were sick with hog cholera at the time of my first visit. I found them in an open lot where the sun was beating down very hot. There was plenty of good shade, but they seemed to prefer the sun. I found them lying in groups, many crawling upon the top of others until a tier of four or five deep was to be seen. It was almost impossible to make them move out of their places. In about five days' time 80 per cent of them had died, and the last information I received concerning them more than 90 per cent had died and they were still dying.

DIAGNOSIS.

If several animals are affected with the symptoms already enumerated, and if a similar disease has been affecting hogs in the immediate vicinity, we may decide that one or both of the diseases in question are present, since no other epizootic disease among hogs has been recognized in these islands.

POST-MORTEM LESIONS.

The autopsy shows lesions of septicæmia which are at times quite puzzling. In the acute form of hog cholera the animals die suddenly, showing on an examination a hemorrhagic condition of the heart muscles, of the bronchial and thoracic lymph glands, and infarcts in the kidneys. Hemorrhages beneath the thoracic and abdominal serous membranes are of frequent occurrence, also of the subcutaneous tissue. The spleen is enlarged to four or five times its normal size. This is indicated by the reddish or bluish blotches on the ventral aspect of the body. The mucous membrane of the stomach is usually deeply reddened. No ulcers will be found in the intestines in these acute cases. The chronic form is more common, and in this disease is almost manifested in the large intestines. The disease in the intestines consist of ulcers or buttons. These may be circular and projecting, or depressed and ragged in outline. They appear most frequently in the cæcum, upper half of the colon, and around the ilio-cæcal valve. The stomach is sometimes ulcerated. The spleen, unilke that in the acute form, is not always enlarged.

In swine plague the primary seat of the disease is to be looked for in the lungs. Here there is inflammation and small and large necrotic areas. The serous membranes also partake of the inflammatory process and by the formation of fibrinous material become adherent.

The lymph glands are always involved and of a very dark color. The central portion of the bones of the spinal column are of a very dark color, which is very apparent when the carcass is split in halves.

TREATMENT.

There has never been discovered a remedy which will cure all causes of any one disease in man or animals. Some outbreaks of these diseases are so violent and rapid that the animals are dead before they are known to be sick. The following is recommended by Doctor Salmon: ℞: Wood charcoal, 1 pound; sulphur, 1 pound; sodium chloride, 2 pounds: sodium bicarbonate, 2 pounds; sodium hyposulphite, 2 pounds; sodium sulphate, 1 pound; antimony sulphate (black antimony), 1 pound.

These ingredients should be completely pulverized and thoroughly mixed. The dose of this mixture is a large tablespoonful for each 200 pounds weight of hogs to be treated, and it should be given only once a day.

He also says "Hogs are fond of this mixture. It increases their appetite, and when they once taste of food with which it has been mixed they will eat it though nothing else would tempt them. Animals that are very sick and that will not come to the feed should be drenched with the medicine shaken up with water." Great care should be exercised in drenching hogs or they will become suffocated. Do not turn the hogs on their backs to drench them, but pull the cheek away from the teeth so as to form a pouch into which the medicine may be slowly poured. It will flow from the cheek into the mouth and when the hog finds out what it is, will stop squealing and swallow. A very easy method is to cut off the toe of an old shoe, insert the cut end into the hog's mouth, and pour the medicine into the shoe. In many experiments, hogs which were so sick that they would not eat commenced to eat very soon after getting a dose of the remedy and steadily improved until they appeared perfectly well. This particularly is the case when the disease is hog cholera.

This medicine may be also used as a preventive of these diseases, and for this purpose should be put in the feed of the whole herd. Care should of course be observed to see that each animal receives its proper share.

With these, as well as all other diseases, precaution is much more important than treatment. If cholera is known to be in the neighborhood, the hogs should be confined in a small lot in which there is no stagnant water and where they will be protected from the hot sun. They should be fed plenty of good nutritious food which is soft and in which should

be mixed daily a dose of the above-described mixture. No one who has recently visited a place where the disease exists should be allowed under any consideration to go in or about lots containing healthy hogs. Care should be taken that the hogs have no access to any grounds which receive drainage from the infected locality. Any animals which are purchased should be placed in quarantine for not less than four weeks before being allowed to run with the herd.

Should the disease make its appearance in a drove, all the animals which appear to be still unaffected should at once be segregated by being placed in pens as far away as possible, thus removing the chances of their becoming infected. Should the disease appear among those which have been moved, the sound animals should again be moved to still another place. This should be repeated as often as the disease makes its appearance. It is of little use to move the sick from the well, as the lot in which they have been kept is thoroughly infected. Different feeders should care for the sick and the well, for fear of carrying the contagion, as a small particle of dirt no larger than a pin's head may easily adhere to the shoe and be carried from the pen in which the sick animals are kept and so spread the disease.

The carcasses of any animals which die from these diseases should be burned if it is possible to do so, as burying is not safe, since the germs will retain their vitality for months in a warm, damp soil, such as we have in these islands. If the carcass is buried the germs may be brought to the surface by worms or dogs, thus producing the right kind of conditions for another outbreak. The lots where the sick animals have been kept should be thoroughly cleaned and disinfected with lime and carbolic acid and should not be used again for six weeks or more. These diseases are so fatal and difficult to treat that too much care can not be exercised to prevent their introduction or spread.

SPECIAL REPORT ON TEXAS FEVER (TICK FEVER, SPANISH FEVER), BY MURRAY J. MYERS.

HISTORY.

In 1796 we find the first known accounts of a disease being disseminated by apparently healthy cattle from certain districts in the Southern States, United States of America, when these cattle were driven north.

Doctor Mease gave an account of an outbreak of this disease which occurred in 1796 in Pennsylvania, United States, as a result of southern cattle being brought and sold there. These cattle were penned over night in a separate field and did not come in contact with the cattle on the farm. Nevertheless, the latter commenced dying a short time afterwards. In every instance where sold they communicated the disease to the cattle with which they mixed.

Many similar outbreaks occurred in the United States in the first half of the nineteenth century, but the accounts of them are too meager to be of use.

Very little more was heard of this disease until about 1850, when cattle bred in the southern portion of the United States began to be driven North for distribution to feeders in the Northern States. A mysterious and highly fatal disease then appeared along the main roads or trails over which these cattle were driven, destroying about 50 per cent of all the native cattle. Persons living near fording places lost as high as 90 per cent. It was several years before the origin of this disease was traced to the southern cattle. In 1868 large herds of southern cattle were sold for feeding throughout the noninfected area. As the hot weather of summer came on, the disease broke out wherever the southern cattle had been taken. Of 320 head of native stock shipped from one farm for slaughter, 224 head died before they reached their destination, and the remainder were said to have been sent to the rendering tanks. At a little town in the northern portion of the United States about 18,000 southern cattle were landed. The disease commenced its destructive work early in the summer, sweeping away nearly every animal of the bovine race in that section. These losses are simply examples of what was occurring in many parts of the Northern States. The disease was finally traced to the southern cattle, and in the absence of specific knowledge concerning its character there was great alarm as to the extent to which it might spread and its effects upon the public health. While the direct loss from the disease was very heavy and brought disaster to many individuals, the contagion was fortunately one which did not spread from the sick native cattle and was consequently self-limited. It was also a disease that was not communicable to man and hence did not appreciably affect the public health.

The tick *Boophilus annulatus*, which transmits Texas fever, is supposed to have been introduced into the Western Hemisphere by the early importations of cattle from Spain and other southern European States. No doubt the tick *Boophilus australis*, the species

common to the Philippine Islands, was brought here by the first importations of cattle from foreign ports.

It is reported that about a year or so ago a herd of Australian cattle were imported to these islands for dairy purposes and after a time was completely wiped out by Texas fever. Only a few months ago a small number of cattle was imported from the United States, a portion of which also died from this disease.

Texas fever in these islands is of importance only to persons who desire to import cattle for various purposes. All cattle that are imported into these islands should come from a section of country where the tick *Boophilus annulatus* or *Boophilus australis* is present, and it should be positively known that they have been infected with one of the above-mentioned species of ticks. If cattle are imported from a section of country where the above-mentioned species of ticks do not exist, then it is necessary for them to be immunized by artificial means before they are allowed to come in contact with the native cattle or turned out on any pasture in these islands. All of the cattle in these islands are infested with the tick, and for this reason they possess a natural immunity against Texas fever.

I have found but two species of ticks in these islands, the *Boophilus australis* and the *Dermacueter electus*. Eight different species of ticks have been found on cattle in the United States.

CAUSES.

It is generally accepted now that Texas fever is transmitted from one animal to another through the medium of the cattle tick *Boophilus australis*. The mature female tick, as seen on the animal's skin, has an oblong oval-shaped body, resembling the seed of a castor-oil plant, and is of a dull leaden color, due to the blood-red contents of the body showing through the distended semitransparent cuticle. It rarely exceeds one-half inch in length and about five-sixteenths of an inch in breadth, and possesses four pairs of legs, situated on the anterior lateral portion of the body. It attaches itself to its hosts by means of peculiar-constructed mouth organs, collectively known as the rostrum, in the center of which is a barbed dart furnished on either side with several rows of teeth, set obliquely, which enable the creature to adhere to the skin more firmly. The male tick is usually found attached to the skin of its host immediately underneath the anterior part of the female. Its body is of a dark-brown color and somewhat triangular in shape, and when full grown is only about one-fifth part of the size of a full-grown female, and never being in an engorged condition.

As the female tick engorges herself with blood she becomes fecundated by the male, and, having arrived at maturity, releases her hold and falls to the ground. On recovering herself she crawls away to some secluded spot and there lays an enormous number of eggs, which agglomerate in a dense mass. As the process of egg-laying proceeds she gradually gets smaller or shrivels up and ultimately dies. A fully-matured female tick is capable of laying from 3,000 to 4,000 eggs. Ticks that are about one-half grown are capable of laying eggs. The period of incubation in a tropical climate is about twenty days after the egg is laid, but if the temperature is lower the incubation period is correspondingly longer. The young ticks that have just been hatched are very tenacious of life. I have kept them in a well-stopped bottle for four months and no further development takes place until they gain access and adhere to some susceptible animal, when, by taking sufficient nourishment for their requirements, they undergo another change or molt, and finally each one appears with its extra pair of legs as perfectly formed male or female, which, by gradual and continual sucking the blood from the body of its host, ultimately arrives at maturity.

We are now in a position to understand and explain the principal features of this disease. It is plain that cattle in infected districts carry in their blood the contagion of Texas fever. This contagion is a protozoan organism called the *Pyrosoma bigeminum*, analogous to the parasite of human malaria. This parasite is transferred to susceptible cattle outside of an infected district by the tick *Boophilus australis*. Cattle from an infected district, although carrying the contagion, are harmless unless infested with this particular tick. Cattle from an infected district carry this contagion in their blood for years after leaving the infected district, and would again be dangerous to other cattle if by any chance they were infested with the proper species of ticks.

Taking it for granted that the tick is regarded as the host of the parasitic protozoon, and in fastening itself to the skin of the animals it inoculates it with the parasite. The pear-shaped parasite is found inside of the red blood cells singly or in pairs. It is also probably true that there are varying degrees of virulence or disease producing powers in different lots of ticks of this species, and this may account in part for different degrees of severity in different outbreaks of the disease, but then there is very little known on this subject. While a few ticks sometimes produce a fatal case of the disease, as a general rule the greater the number of ticks the more severe the disease.

SYMPTOMS.

The symptoms vary according to the severity of the attack. Often an animal is found dead before it is known to be sick, while again the animal may be sick for some time.

In the acute form the animal has a very high fever, and as the disease progresses the heart's action becomes more rapid, until we find the number of pulsations increase to 100 or 120 per minute, nearly double that of the healthy animal. The respirations range from 70 to 120 per minute, the animal becomes somewhat unconscious, and has a staggering gait. The nose and lips become of a very pale color, hot, and dry. The animal refuses to eat; rumination or chewing the cud ceases entirely. In the earlier stages the dung, owing to constipation, appears as small round balls, often coated with blood-stained mucus. Constipation is followed by diarrhea in the latter stages. A very important and almost characteristic symptom, from which the disease takes the name "red water," is the color of the urine, which varies from a deep yellow to a dark red, almost black, according to the stage of the disease.

The presence of the tick is a very important symptom, for without it this disease is not possible except by direct inoculation of the blood.

POST-MORTEM LESIONS.

On opening up the abdomen and exposing the internal organs the first striking feature is the enormous enlargement of the spleen, which may weigh as much at seven or eight pounds, while a healthy spleen weighs only two or three pounds. On cutting through the substance of the spleen each surface presents a dark red, almost black, tarry appearance, while the structure is so disintegrated and friable that if the spleen in most cases is held up by one end the pulp will gravitate quite freely toward the other end. In many cases the fat and connective tissue is of a deep lemon-yellow color, which is indicative of jaundice. The liver is always more or less affected, being considerably enlarged, and the color varies from normal to a light yellowish-brown color, extremely friable. The bile ducts and gall bladder are very much distended with dark-greenish contents, often very thick in consistency and somewhat glandular. The kidneys are slightly enlarged, very light in color, and may show hemorrhages on the outer surface. In very advanced cases of the acute type the connective tissue which covers the kidneys is found to be in an œdematous condition.

The heart shows small hemorrhages on the inner and outer walls. The lungs, as a rule, are apparently normal.

The first and second stomachs are usually found to be in a normal condition, but the third stomach is naturally very much impacted, which is very misleading to those unfamiliar with such matters. The fourth or true stomach has a very decided congested appearance, the mucous membrane being covered with patches or petechiæ. In some instances these petechiæ undergo a kind of granulation.

The small and large intestines are usually in a more or less congested state, with small hemorrhagic patches on the mucous membrane. In acute cases there may be a sloughing of parts of the mucous membrane from the colon and rectum which come away with the dung.

The bladder usually contains urine varying in color from a bright orange to a deep port wine, or almost black, and in addition small quantities of mucus and broken-down blood cells.

In the early stages of the disease the muscular tissue is firm and has quite a normal appearance, but in the advanced stages of the acute type we have a totally different condition. The muscles are soft and clammy and of a light-pink color, due to the anæmic condition of the animal. In chronic cases there is little to be noted except the extreme emaciation and bloodless, pale condition of the entire body.

DIAGNOSIS

In this disease a diagnosis can easily be made by proving the presence of the parasite in the blood.

COURSE AND TERMINATION.

The usual course of the disease is a rapid one with early death, or cessation of the aggravated symptoms in from five to ten days and subsequent recovery. But these sometimes develop a secondary or chronic form of the disease that may end fatally after several months, if the animal fails to get good food and care.

Many of these cases of the chronic form are very puzzling as they show no special evidences of disease, but gradually become poorer and poorer although eating until diarrhea sets in; swelling appears along the underparts of the body and death results from inanition.

TREATMENT.

Medical treatment of Texas fever is not satisfactory. A great many remedies have been tried, but without any good results. The most satisfactory treatment is good care and surroundings and nourishment to sustain the animal until the fever subsides. The following plan of treatment has given the best results. As soon as an outbreak of Texas fever occurs, remove all susceptible animals to fresh uninfected ground. Remove all cattle ticks from susceptible animals by greasing with lard or similar oil and scraping the ticks off with a dull knife blade. Green feed should be given. This furnishes a palatable and nutritious food and has a laxative effect upon the bowels. Sick cattle should be moved to comfortable, shady quarters, and given access to fresh water. In cases where it is practicable, drenching with sweet milk has given good results.

PREVENTIONS.

Cattle can be immunized artificially against Texas fever by direct inoculation of blood from an immune animal into the blood of one that is susceptible, or by infesting [redacted] cattle with the tick *Boophilus australis*.

The most suitable subjects for inoculation are young cattle from six to twelve months of age and in good condition as to flesh.

The initial dose of blood should be small, not to exceed 1 or 2 c. c. of fresh defibrinated blood. Since the initial dose of 1 c. c. of fresh blood is capable of producing a high fever and marked destruction of the blood corpuscles, it must be unsafe to give a much larger quantity.

In from seven to ten days the inoculated animal will develop a case of Texas fever which is usually of a mild type. If the attack is a severe one it should be treated as directed for Texas fever. In some cases the attack is so mild that it will require close watching and the use of the thermometer to detect any disturbance whatever. After recovery from the attack produced after the first inoculation, a second inoculation may be made if desired.

Like results may be obtained by infesting a susceptible animal with a few ticks, thus producing a mild attack of the disease. After the animal has recovered from the attack produced by the first infestation of ticks, it should again be infested with them, but the second time more ticks should be used. Good results have been obtained by a tick infestation following the inoculation of blood.

CLINICAL NOTES ON SURRA BY DR. THOMAS M. OWEN, VETERINARIAN, BOARD OF HEALTH.

Surra may be defined as a specific and infectious febrile disease, which may affect all species of animals. It is due to the presence of a flagellate protozoon (*trypanosoma evansi*) in the blood. It is characterized by an intermittent, remittent, and relapsing fever. The symptoms not only vary but differ according to the species of animals attacked. The symptoms usually described by writers are those pertaining particularly to the horse. Owing to several recent and extensive epidemics of surra among carabao, it is most important that the subject should be given special attention, as the disease manifests considerable variations in different species of animals, as the mortality varies also.

Symptoms noted in the horse.—Provided we are in a surra zone and where temperatures are recorded daily, as with the army, a marked fever is invariably the first symptom noted. The skin feels hot and there may be a temporary loss of appetite, together with a thirst, which is more or less abnormal. The most constant and invariable symptom in the progress of the disease is the wasting away of the flesh, notwithstanding the ravenous appetite. This wasting away goes on more rapidly in some cases than in others. The animal becomes inactive and sluggish and allows the head to drop carelessly. Finally œdema of the genitals and dependent parts appears, particularly of the hind legs, belly, and scrotum (of the males).

The gait becomes staggering, and finally the animal falls.

In these cases there are slight catarrhal symptoms, weeping of the eyes, and often there is a watery discharge from the nose, sometimes followed by a gelatinous or purulent discharge from the eyes and nose. The mucous membrane becomes yellow and pale. The respiratory movements are usually quickened from the start, sometimes out of all proportion to the pulse, and frequently appear to be entirely abdominal. In most instances profuse sweating occurs before death.

The duration of the disease varies as to age, general condition, and care. Weak animals succumb more quickly than strong ones; in some cases the course is very rapid, it may be shorter than ten days or two weeks. However, animals given proper attention usually live from four to eight weeks.

Mortality.—The mortality among horses and mules is 100 per cent.

Symptoms noted in the carabao.—With this animal the progress of the disease is variable, and greatly depends upon the condition of the animal when attacked. Carabao, like cattle,

possess more natural immunity than other domesticated animals, and may be infected with surra (*trypanosoma evansi*) for months, and ultimately recover.

In the early stages of this disease we have no defined symptoms by which we may detect an infected animal, except by a microscopical examination. Without such examination we do not detect the disease until the latter stages begin to show upon the weak animals, from two to three months after infection; when a dull, sunken condition of the eyes, and a weeping of tears are noticed.

In strong animals it may be ten months before the disease is detected where a blood examination is not made. The mucous membrane which can be easily seen beneath the eyelid (due to the sunken eye) is of a pale yellow color. The action is sluggish with a dragging of the hind legs on the ground. During this time the wasting has been steadily progressive, especially at the muscles of the back, and those surrounding the hip joint (glutei muscles), However, œdema, which is so commonly seen in the horse, is rarely perceptible in the carabao.

In [illegible] continued cases the muscles of the back are found to have undergone considerable [illegible] using the back to be well roached. In these cases the muzzle (or the lower portion [illegible] face) or the legs, or both, present a spotted appearance from the loss of pigment, due probably to a sluggish or defective circulation.

The duration of the disease is very variable and usually chronic, owing to the power of resistance of the animal. Carabaos may die suddenly, but usually are taken with recurrent fever, from which they may apparently recover only to succumb during some later recrudescence of the disease. The animal may be taken with a high fever, or the temperature may be below normal.

Great emaciation takes place and the carabao is unable to stand, and may lie for days without being able to rise, when suddenly the animal partially regains his strength and apparently recovers. After a varying period of days he may be taken as before, when he dies apparently from exhaustion.

The parasite is usally found by a microscopical examination during these attacks.

Mortality.—The mortality among carabao and cattle varies according to the condition of the animal infected and to the care it receives. Without good care, a large number of weak animals die if infected; the mortality is slight among carabao which receive the best of attention.

Modes of transmission of surra.—There can be no doubt as to the certainty of the fly theory. It is a well-established fact that horseflies act as direct transmitters of the surra organisms, causing direct subcutaneous inoculations from one animal to another. During a recent epidemic of surra it was found that a large per cent of the body fluids of horseflies which were caught throughout the infected zone contained the surra parasite.

Open wounds are also a constant source of danger during the prevalence of the disease, not only on account of flies, but of infected currycombs, brushes, and sponges coming in contact with the wounds.

Treatment.—As the mortality of most animals is 100 per cent, except in carabao and cattle, nothing can be said of the former. Carabao and cattle require the best of care and attention, and should be given the best of nutritious food, together with plenty of pure water.

No satisfactory serum treatment has as yet been discovered. There are no specifics; in fact, drugs thus far used in the disease seem to be of little value.

Prevention.—When surra is found among horses or mules all infected ones should be immediately destroyed and buried at a proper depth, so as not to spread the infection. The healthy animals should be removed as quickly as possible and transferred to dark, spacious, well-ventilated, fly-proof, stalls. (Experience proves that in dark places few, if any, flies are found.)

Temperatures of the remaining animals should be recorded daily, and should abnormal temperatures be found, the animal should be looked upon with suspicion, and be removed to some other quarters to await further developments. In all cases where an elevation of temperature is recorded a microscopical examination of the blood should be made until the organism is found, when the animal should be disposed of. Animals should not be staked, or run out, during the prevalence of the disease, but should be kept in their stables as much as possible. Solutions of creolin and carbolic acid should be used freely and often about the premises, or any disinfectant which may drive away flies.

REPORT OF MEDICAL SUPERINTENDENT, CHINESE HOSPITAL FOR CONTAGIOUS DISEASES.

Dr. Tee Han Kee reported on the Chinese hospital for infectious diseases for the year ending August 31, 1904, as follows:

"*Plague hospital.*—From July 1, 1903, to date 19 cases of bubonic plague have been admitted. Of these 14 died and 5 cases recovered, a mortality of 73¾ per cent. The

mortality is by no means low, but in comparison with that of my report of last year it is very much lower, and the number of persons affected with this disease has also greatly decreased. In my report of last year there were 48 cases, with 44 deaths, a mortality of 91¾ per cent. I have attributed the lowering of the mortality and the decrease of the persons affected to the effective measures taken by the board of health in inoculating the Chinese with plague prophylactic serum, and if such work be carried out regularly every year I am of the opinion that in two years' time plague will be completely stamped out.

"The plague patients were as usual treated by the Chinese practicante in charge of the hospital, but during the last twelve months I, personally, had more opportunity to experiment as to the effect of the antipestic serum. Of the 19 cases 11 were treated with this serum, and the result was that 5 recovered, showing a fairly good percentage of recoveries from the use of the antipestic serum. The majority of these plague cases were received too late for any successful treatment, 6 cases having succumbed to the disease in from ten minutes to four hours after admission into the hospital.

"*Cholera hospital.*—Only 7 cases of cholera have been admitted into this hospital during the last twelve months, with the result of 6 deaths and 1 recovery, a mortality of 85⅞ per cent. The cases admitted for treatment were so few that no satisfactory conclusion could be drawn as to the efficacy of the treatment used in this hospital.

"*Smallpox hospital.*—Not a single case of smallpox has been admitted. This disease is really very rare among the Chinese residents of this city, owing undoubtedly to the fact that every Chinaman had to be vaccinated by a doctor of the Marine-Hospital Service of the United States at the port of his departure for Manila, and also to the compulsory measures used by our board of health to vaccinate everybody once a year.

"*Hospital staff and maintenance of the hospital.*—The hospital staff, as usual, consists of one nonqualified Chinese practicante, appointed by the Chinese chamber of commerce, one chief ward master, four hospital attendants, and one cook. The hospital is maintained by the Chinese chamber of commerce, and during the twenty months from October, 1902, to December 31, 1903, this community has subscribed and expended $39,767.88 Mexican currency for the building of the new plague hospital and for the maintenance of the infectious-disease hospitals."

SPECIAL REPORT ON BILIBID PRISON.

Dr. William R. Moulden, resident physician of Bilibid penitentiary, submits the following report under date of July 14, 1904, to the warden:

"During the year 12,167 prisoners reported at morning sick call. Of this number 11,244 were prescribed for and returned to work, while 923 were admitted to the hospital. Of the total number treated in the hospital 265 died and 658 recovered.

"There were 11,716 visits made to the hospital for the treatment of diseases of the eye, ear, nose, throat, and skin, genito-urinary system, and diseases of minor surgical importance. These prisoners were returned immediately to work, losing on an average one hour a day until cured. The average number of days that each prisoner reported for treatment was seven. The average length of illness in hospital, excluding tuberculosis, was thirteen days.

"Smallpox occurred in its most virulent form in March, 1904, 4 out of 6 ill with the disease dying from the infection.

"As the entire prison population is vaccinated every four months and all new arrivals vaccinated in quarantine, the solution of the cause of the smallpox epidemic lies in the fact that as the disease has a very long incubation period, and the quarantine, owing to the crowded condition of the prison and to the lack of proper quarantine facilities, being of one day only, is insufficient to render the vaccinated prisoners immune or to admit of the development of the disease if already present previous to admittance to the prison.

"The question of quarantine in an institution of the magnitude of this prison is a serious one, and while the writer is fully alive to the difficulties of providing accommodations for the large number of men that enter the prison every day, he most earnestly recommends that some action be taken, as soon as practicable, toward establishing a quarantine building with at least five compartments, allowing for the proper isolation of each day's admissions. In this way a complete and exhaustive examination of each may be made, not only for cholera, plague, and smallpox, but for the far more important, because less dreaded and therefore less noticed, diseases of tuberculosis and leprosy.

"By far the most important disease that has occurred among the prisoners is lobar pneumonia, a disease not commonly recognized as occurring in tropical countries, but which, partly owing to artificially produced conditions, has attained a virulency and strength that makes it stand at the head of the list of death producers.

"The cause or causes responsible for the presence of this disease here in the prison deserve careful and thorough investigation and consideration, for it is to prophylaxis that we must

look for help, as there is as yet no antitoxin to invoke to counteract the ravages of the disease.

"A most complete and conservative investigation of this subject has forced the writer to the conclusion that the presence of lobar pneumonia among the prisoners is due mainly to the overcrowding that exists throughout the entire prison—overcrowding such as it is difficult to comprehend except by actual observation and experience—to the extent that men are forced to sleep as close together as it is possible for them to lie side by side, breathing and rebreathing the poisonous exhalations from lungs and skin until to one unaccustomed it is inconceivably sickening, repulsive, and unendurable.

"The inevitable result of exposure, night after night, to this condition is a lowering of the strength, vitality, and resisting powers of the individual that renders him peculiarly susceptible to diseases of the lungs—a ready prey to the germs of pneumonia and tuberculosis.

"Estimation of the cubic air space of the ward buildings reveals the fact that buildings that should contain not over 200 men are at present sheltering 500 and over.

"A careful and exhaustive study of the subject of the ventilation of sleeping quarters, based upon the peculiar needs and conditions existing in a prison in the Tropics, has convinced the writer that each individual should have at least 3 feet of bed space and 300 cubic feet of air space allotted him. This is considered the lowest possible estimate consistent with health and efficiency.

"It is therefore recommended that some action be taken, as soon as practicable, toward providing for the enlargement of the sleeping quarters to the needed dimensions.

"Another very well-marked predisposing cause to disease of the lungs is the exposure in thin garments to the wet and comparatively cold air of the rainy season. As most of the men are unavoidably drenched in the rain during the working day it seems wise and expedient to provide a heavier garment than that worn during the dry season.

"During the last month another disease that owes its origin mainly to overcrowding, namely, beriberi, has broken out among the prisoners. Although as yet there have been but 6 cases, the indications point to a larger number in the near future, provided something is not soon done to improve the conditions.

"While every effort possible has been made by the management of the prison to second the writer's endeavor to provide a modern hospital, with the necessary appurtenances for the large number of sick in the prison, the resident physician feels it his duty to invite attention to the inadequate equipment at his disposal for the approved modern treatment of disease, general and surgical, and to request that the matter of providing a complete, modern hospital, with attached quarantine wards, and the employment of four additional American hospital attendants to take the place of the uncertain and doubtfully efficient prison help, be taken up at as early a date as possible.

"The resident physician wishes to express his thanks to the management of the government laboratory for the establishment in the prison hosiptal of a branch laboratory for diagnostic purposes. This has made possible an accuracy and precision hitherto impossible in the scientific treatment and prevention of disease.

"During the three months of its establishment here the writer has made 386 sputum examinations for the diagnosis of tuberculosis of the lungs, 33 blood examiations for malaria, 76 urinalyses, and 27 examinations of feces for amebic dysentery."

REPORT OF THE CEBU LEPER HOSPITAL.

Father Filomeno Flores, superintendent of the leper hospital in the city of Cebu, reports as follows July 15, 1904:

"At the beginning of July, 1903, there were on hand at the leper hospital of Cebu 209 patients.

"During the fiscal year from July, 1903, to June, 1904, several lepers suffered with other diseases at the leper hospital. Some of them recovered and others died.

"The most frequent diseases were fevers, malarial fever, and diarrhea, and I have treated them all with quinine and phenacetine, and the last one with 'manzanilla' and some drops of chlorodine or with salicilate of bismuth.

"I also wish to inform you that since the time the patients were supplied with a sufficient quantity of iodoform and cotton they have suffered less from their wounds and several of these have healed.

"I shall also state that the bishop of Cebu and other charitable persons have given frequently alms for the lepers, and that I spent these amounts in preparing extraordinary meals for them and in buying them some clothing. They have had at least a few extra dishes each month.

"I am always with them in the mornings and in the afternoons, examining their rations and making inspections or administering medicines to those who keep beds.

"My object in doing this is because I do not only think it my duty, but also because I want to make their condition more bearable, if possible, and for this reason, and notwithstanding that my acts are still very far from what is demanded by true charity and that the lepers regard me as their own father, I preach to them, celebrate mass, administer them the holy sacraments, and finally teach them the duties of a Christian.

"During the year 1899 I built two camarins, by order of Mr. Maclernan, with kitchens and closets.

"I will finally state that I have been already serving the lepers for fourteen years."

REPORT OF THE PALESTINA LEPER HOSPITAL.

	Males.				Females.				Grand total.
	Single.	Married.	Widowed.	Total.	Single.	Married.	Widowed.	Total.	
Lepers in hospital July 1, 1903	15	2	1	18	6	2	1	9	27
Admitted	2			2	2			2	4
Total	17	2	1	20	8	2	1	11	31
Died	4			4	3			3	7
Escaped					1				1
Remaining in hospital June 30, 1904	13	2	1	16	4	2	1	8	23

One male and 1 female patient were admitted in September, 1 female in October, and 1 male in May. One male and 2 females died in July, 1 male in August, 1 male in October, 1 male in January, and 1 female in March. One female escaped in July. All patients are adults with the exception of a little girl.

REPORT OF SPECIAL SANITARY INSPECTION OF THE PROVINCE OF ALBAY.

Dr. H. B. Wilkinson, special inspector, reported on September 24, 1903, in regard to Albay province, as follows:

"I found 339 prisoners confined in the two jails. The main jail, located in the back part of the building occupied as offices by the provincial officials is in good state of repair, clean, dry, and apparently well kept, but the windows are too small, admitting very little sunlight, and it is too much crowded. This jail has five cells and two sick halls, containing in all 244 prisoners. Three of the cells which have a floor space of only 20 by 30 feet contain, respectively, 47, 49, and 52 natives. There were 32 sick in this building, 15 cases of beriberi, and 17 with various other diseases.

"The smaller jail was of light material, with dirt floor, but provided with elevated beds and free ventilation.

"The food seemed fairly well prepared, but consisted too largely of rice and fish. The amount of fresh meat furnished was small, with little or no fresh vegetables, beans, etc.

"On September 10 I accompanied Colonel Bandholtz and the governor to Tabaco, Albay Province, where I found the health good and no epidemic diseases, returning to Legaspi on the 11th.

"On September 12 and 13 I went up into the interior of Albay Province as far as Guinobatan and Ligao. There is no cholera in this section, but some smallpox generally scattered The doctors here report that vaccine virus is usually inactive when it reaches them. This was more especially complained of by an army surgeon who got his virus through the United States army medical supply depot."

REPORT OF SPECIAL SANITARY INSPECTION OF THE PROVINCE OF BATAAN.

Dr. Luis Abella, medical inspector, board of health for the Philippine Islands, under date of January 25, 1904, submits the following report on the province of Bataan:

"PROVINCIAL BOARD OF HEALTH.

"I have inspected the provincial board of health, which is composed of an acting president, who is president of the municipal board of health; the supervisor, and the provincial secretary.

"The province has no president of the provincial board of health at present, the former president having been transferred to the province of Zambales.

"The provincial board of health has done sanitary work in the whole province, issuing ordinances concerning the cleaning of houses, yards, streets, squares, and markets; inspection of cattle for public sale and causing to be punished all infractors. It also took vigorous steps to destroy rinderpest among carabaos.

"In September, 1903, cholera made its appearance in the province, and the proper steps were taken to combat it. Records are kept in various kinds of books, such as ordinance book, letters sent and letters received book, and are clearly and faithfully kept. Reports are sent monthly.

"MUNICIPALITIES.

"*Balanga.*—The municipal board of health of this place consists of a municipal president, who has a registered title as 'cirujano ministrante;' a citizen, and a school-teacher as members. The municipal secretary acts as secretary of the municipal board of health.

"The municipal board of health has been engaged in compiling sanitary municipal ordinances, inspecting houses, yards, streets, squares, and markets. These inspections are made by the president of the municipal board of health himself, assisted by the municipal police. He has caused all infractors of ordinances to be fined and punished.

"The records are kept in such books as death, birth, letters received, letters sent, and vaccination books. Reports are sent monthly to the provincial board of health. The president of the municipal board of health, Mr. Pantaleon Baza, is an intelligent and capable person; he is an old resident in the province and has a good reputation among the people. He is at present acting as president of the provincial board of health. He attends the poor of the town, the constabulary, and the prisoners gratuitously.

"I found the town of Balanga neat and in good sanitary condition, fecal matter being deposited in the ground at a depth of 1 meter, and then covered up with earth, lime, or ashes. This system of fecal disposal is not adopted by all houses, as I saw much fecal matter deposited on the ground near several houses. Ordinances are in existence for the sanitary maintenance of pigs, but I noticed many of them running loose and in a very miserable condition. There is a cemetery outside the town, which is surrounded by a wall, and is in a good sanitary condition.

"*Pilar.*—This town is consolidated with that of Balanga and is somewhat neglected in matters of sanitation; the members of the municipal council failing to make the people comply with existing ordinances. I noticed many yards and streets in a dirty condition, and many pigs were seen running loose on the streets. Diseases common among the inhabitants in the locality are tuberculosis, malaria, and infantile convulsions. I also saw three good houses capable of holding 50 beds in event of their being used as hospitals.

"*Abucay.*—This town has no organized municipal board of health, on account of its limited resources or means. The municipal board is engaged in compelling the people to comply with ordinances issued by the provincial board of health, together with their own ordinances, which can be seen in the book of acts. Records are kept in two books; one for births and one for deaths, the latter being kept by the municipal secretary in a very confused manner. Reports are sent to the provincial board of health monthly.

"Notwithstanding the absence of a municipal board of health, the rules of hygiene have been observed among the people. Houses, yards, streets, and markets are neat, but nearly all latrines are kept in a bad condition. Many pigs are seen on the streets. The sanitary condition is fair, and the death rate comparatively low.

"The barrio of Mabatan, which has been consolidated with Abucay, consists of a number of small houses, whose inhabitants care very little for sanitation, there being no one to enforce sanitary regulations.

"Diseases common in this town are tuberculosis, dysentery, and infantile convulsions.

"*Orion.*—This town has an organized municipal board of health, which consists of a president, a citizen, and the school-teacher as members, the secretary of the municipality acting as secretary of the municipal board of health. The work done by this board is as follows: Enforcing all municipal ordinances; inspecting houses, yards, streets, squares, markets, and the inspection of cattle for public sale; supervising the cleaning of rivers and wells and causing to be punished and fined all infractors of said ordinances. These inspections are performed by the president himself, assisted by the police. Records of the town are kept in two books, one being for registration of births and the other for deaths. The registration of deaths is very poorly kept.

"The president of the municipal board of health, Señor Patricio Doloroso, is a practicante and a native of this town. I heard no complaints against him, although his medical knowledge is poor, which consequently makes his diagnosis doubtful. He is acquainted with the rules of hygiene and sanitation, having caused to be punished and fined all infractors of municipal ordinances.

"I found this town in a satisfactory condition as regards sanitation; latrines being at a

depth of 1 meter in the ground, and filled by degrees, covered with earth, lime, or ashes. Some houses do not use latrines at all. The cemetery is outside the town and is surrounded by a wall.

"Diseases which are common among the inhabitants are tuberculosis, malaria, and infantile convulsions. Many cases of smallpox were registered last year. Many children were vaccinated, but nearly all who were vaccinated were negative, which was probably due to the vaccine virus being old. There are a few cases registered in a barrio near this town.

"A house is available for a hospital, which would be capable of holding from forty to fifty beds. There are three insane in the town.

"*Orani.*—The municipal board of health of this town is composed of a citizen and the schoolteacher as members, and the municipal secretary, who acts as secretary to the municipal board of health. As there is no person capable of filling the position of president of the municipal board, the place is temporarily held by the municipal president.

"The board has been engaged in enforcing ordinances for the sanitary maintenance of houses, streets, yards, markets, squares, and other public places; the inspection of cattle for public use, and the sanitary maintenance of rivers. Inspections are made by the municipal president and his secretary, assisted by the police. The board has caused all infractors of ordinances to be fined and punished.

"During the cholera epidemic the board took vigorous steps in enforcing regulations issued by the provincial board of health. A disinfecting gang was organized and all houses infected with cholera were disinfected. All contacts were quarantined. Two hospitals were established, one being used for poor people and the other for the better class.

"The municipal board provided a special cemetery for the purpose of burying those dying of cholera. All cholera patients were given appropriate medical assistance, and special attention was directed toward the food and drink supplied to each patient.

"Reports are kept by the secretary of the municipal board. He seems to be an intelligent man, but not fitted for the position he is filling. Circulars and ordinances are kept on file, and other records are kept in such books as an act, birth, and death book. Monthly reports are sent to the provincial board of health. The town is neat and in a very good sanitary condition.

"The town of Samal has been consolidated with Orani and depends entirely upon the latter. In my opinion, Samal is one of the most insanitary towns in Bataan Province. Its location is such that it is subjected to overflow by the tide, which, when it recedes, leaves all kinds of dirt and other deleterious matter.

"The inhabitants are obliged to live in the higher part of the town, so that all houses are located near each other. Hygienic and sanitary rules and regulations are not observed, which is partly due to the negligence of the officials in enforcing same. Having heard of some cases of smallpox in the town, I suggested that a vaccinator with sufficient virus be sent there. Diseases common in the locality are malaria, infantile convulsions, and tuberculosis.

"A house capable of holding 50 beds for a hospital is available in this town, and I found but three insane persons.

"*Dinalupijan.*—Up to March of 1903 there was an organized municipal board of health, but owing to the resignation of the president of the municipal board of health at that time there has been no organized board since that month, and the keeping of all records has been left in the hands of the municipal secretary. Through the inefficiency of the secretary the records were very much confused, and I was unable to obtain reliable information from his records.

"The sanitary measures of this town consist in the cleaning of houses, the sweeping of streets, and the burning of sweepings. Latrines are not cared for, and pigs may be seen on the streets. Cattle for public sale are not inspected.

"When cholera made its appearance steps were taken to face it, and hospitals were organized and maintained for the treatment of cholera patients.

"The town of Hermosa has been consolidated with that of Dinalupijan, and seems to be very poorly kept as regards to hygiene and sanitation. Streets and yards are in an insanitary condition, and animals are allowed to run loose everywhere. Diseases common in the locality are infantile convulsions, malaria, and tuberculosis.

"The towns of Mariveles, Bagas, and Morong, which are situated on the opposite coast of the province of Bataan, have not been inspected as yet, as no means of transportation to these places are available. It was impossible to collect accurate vital statistics, owing to the confused and inaccurate method in which they are kept.

"CHOLERA EPIDEMIC.

"Cholera made its appearance in the whole province of Bataan at the same time. It commenced in the month of September and completely disappeared at the end of November, last year. In some towns more cases were observed than in most barrios.

"The municipal board of each town enforced all steps adopted by the provincial board of health, giving special attention to the quarantine and disinfection of houses infected

with cholera. The sale of green fruits and noxious food was prohibited, and inspection of food and drink was carried out.

"Bathing and the washing of clothes in the river have been prohibited for the purpose of keeping the river free from contamination.

"In some towns hospitals were organized for the reception of cholera patients, where all were treated free of charge. In all the towns of the province the cholera dead were buried in special cemeteries situated out of town. It is to be observed that the towns of Balanga and Orani had more deaths than the rest. Since November last no cases of cholera have been registered in the whole province of Bataan.

"CUSTOMS AND HABITS OF THE PEOPLE.

"Generally, it can be stated that the inhabitants of the province of Bataan understand hygiene and sanitation; and it is to be observed that the wealthy people commonly practice these rules, making a very good impression upon the poorer class. The poor people do not generally practice these rules on account of their methods of living.

"The towns on the coast are much better supplied with the necessities and conveniences of life than those in the interior. I observed that these people pay very little attention to the sick, wherefrom a very high mortality occurs, especially among children.

"Notwithstanding what has been stated, in my opinion this province can be considered in good sanitary condition, and for its improvement I suggest the following:

"1. That a president of the provincial board of health be named as soon as possible, so that he may organize municipal boards of health necessary for the proper sanitary maintenance of towns.

"2. That more vaccinators be sent with fresh and sufficient vaccine virus to protect the province from smallpox.

"3. That help be extended to the poorer towns to enable them to pay the salary of a capable president of the municipal board of health.

"4. That all domestic animals suffering from incurable, infectious, or contagious diseases be killed.

"5. That the cooperation of all municipal boards of health with the provincial board of health be insisted on."

REPORT OF SPECIAL SANITARY INSPECTION OF THE PROVINCE OF CAVITE.

Dr. Paul C. Clements, medical inspector, under date of February 23, 1904, reports that he has inspected all the municipalities of the province of Cavite, in addition to the office of the president of the provincial board of health, and finds as follows:

"PROVINCIAL BOARD OF HEALTH.

"The provincial board of health of Cavite consists of Mariano Felisardo, L. M., president; Russell Suter, provincial supervisor, and Isabelo Diwa, L. M., president of the municipal board of health of the town of Cavite.

"The president of this board has been active in securing the adoption by the various municipalities of a series of ordinances relating to sanitary affairs, which are fairly complete, and which, as they are enforced and in proportion to the intelligence with which they are enforced, will be found to be effective instruments of sanitation. The clerical work of the office is alone a heavy task for one person, but it is well kept up and well systematized. Reports are regularly received from all municipalities showing the number of births, deaths, marriages, vaccinations, cases of contagious diseases, sanitary inspections, etc.

"Smallpox has been present in nearly all towns in this province during the year 1903. The four insular vaccinators who were assigned to this province were put to work in the towns of Cavite, Imus, Naic, and Indan, where they were put at the time of my inspection, having been at work for about two weeks, and having averaged only about 40 vaccinations per man per day for the time they had worked, which appears to me a very low figure.

"The municipalities of this province have recently been reduced in number from 23 to 11, enabling the provincial president to retain the best of the municipal presidents of boards of health, and this has been done.

"MUNICIPAL BOARDS OF HEALTH.

"*Cavite.*—The board of health consists of Isabelo Diwa, L. M., president; Dr. W. H. Bucher, naval surgeon; Richard Leonard, teacher; José Salamanca, pharmacist, and Ramon Maceo, elected member. Four sanitary inspectors are employed for house to

house inspection. Garbage is collected at the expense of the municipality, and a small crematory is maintained. The former municipality of Cavite has a good market; the districts of San Roque and Caridad, which are included since the fusion, have only temporary structures. The markets and slaughterhouses receive frequent visits from both the provincial and municipal presidents. The municipal ordinances relating to sanitary matters in force cover the following points: Quarantine of infectious and contagious diseases; regulation of cemeteries and interments; regulation of sale of food products; inspection of animals killed for food and inspection of abattoirs; impounding of loose animals; compulsory vaccination; cleaning and inspection of private premises, and the reporting of deaths and births.

"The records of this office are in good shape, and the required reports are promptly forwarded. The former municipalities of San Roque and Caridad are now included in Cavite.

"*Noveleta.*—This town now includes the former municipalities of Rosario and Cavite Viejo. The president of the municipal board of health held the same appointment in Cavite Viejo previously to the fusion of the towns. His name is Andres Malahab, and is a graduate of cirujano ministrante. The other members of the municipal board of health are Caledonio Santa Maria, elected member, and Mr. Whiting, school-teacher.

"The municipal sanitary ordinances in force cover the following: Cleaning and inspection of premises; regulation of sale of food products and inspection of markets and slaughterhouses; the reporting of births and deaths; regulation of cemeteries and interments; quarantine of infectious and contagious diseases, and compulsory vaccination.

"Each of the three districts corresponding to the former independent towns has a provisional market and abattoir. No provision has been made by the 'consejo" for a sanitary inspector to assist the president, on account of the poverty of the municipal treasury, and it is more than one man can possibly do to carry out the inspections already provided for in the ordinances. The time of the president is principally spent in house to house inspection and the vaccination of children. The clerical work is kept in good shape.

"*San Francisco de Malabon.*—This town includes the former municipalities of Santa Cruz de Malabon. Previously to the fusion the president of the municipal board of health, Arcadio Arayeta, held the same appointment in Santa Cruz. He is a graduate cirujano ministrante. The other members are Dr. J. O'Neill, the military surgeon; Carl D. Behrens, school-teacher, and Benigno Sarayba, elected member.

"The sanitary ordinances in force provide for cleaning, drainage, and inspection of private premises; reporting of births and deaths; quarantine and compulsory vaccination, and impounding of loose animals.

"The president of the board of health has one sanitary inspector to assist him. Office work is well kept up.

"*Imus.*—With this town are fused the former municipalities of Bacoor and Perez Das Mariñas. The president of the municipal board of health, Pedro Bañas, is a graduate cirujano ministrante, and was formerly the president of the board of health of Bacoor. The other members of the board are Dr. W. H. Dade, military surgeon; E. T. Eichenberg, school-teacher; Mariano Carreon, pharmacist, and Cayetano Tapacio, elected member.

"The municipal ordinances provide for the cleaning, drainage, and inspection of private premises; regulation of sale of food products; regulation of undertaking establishments and interments; the housing of live stock apart from living quarters; quarantine; compulsory vaccination, and the reporting of births, deaths, and contagious diseases.

"No provision for sanitary inspectors had been made at the time of my visit, but the matter was in projection with good prospect of passing the council. Office work in good shape.

"*Naic.*—Now includes the former municipality of Ternate. The local board of health consists of Miguel Garcia, president, a graduate cirujano ministrante, with service since 1902; Dr. M. E. Hughes, military surgeon; Clyde A. Dewitt, school-teacher, and Ariston Avilla, elected member.

"The municipal ordinances make provision for the cleaning of private premises and of the section of street corresponding to same by owner or occupant, and for sanitary inspection; notification of births, deaths, and contagious diseases; quarantine and compulsory vaccination; regulation of sale of food products, and prior inspection of animals killed for food.

"One sanitary inspector is provided for the district of Ternate. The collection and cremation of garbage at the cost of the town was being discussed. Clerical work in good shape.

"*Maragondon.*—Now includes the former municipality of Magallanes. The president of the local board of health is Ambrosio Arca, a graduate cirujano ministrante, who has held the office since 1902; H. H. Kenogy, school-teacher, and Juan Narvaez, elected member.

"The municipal ordinances provide for the cleaning and inspection of private premises; the reporting of births, deaths, and of sickness; quarantine and compulsory vaccination; regulation of interments; regulation of sale of foods; prior inspection of animals killed

for food; impounding of loose animals, and the prohibition of use of any part of animals dead of infectious disease.

"The streets are cleaned at the cost of the municipal treasury, and the collected garbage is burnt in the open. One sanitary inspector is provided for, and is assigned to the district corresponding to the former municipality of Magallanes. The required reports are intelligible and promptly rendered, and the records are properly kept.

"*Indan.*—The local board of health consists of Esteban Abutin, a graduate cirujano ministrante, president; C. J. Anderson, school-teacher; Vicente Jeciel, pharmacist, and Marcelo Basa, elected.

"The municipal ordinances provide for sanitary inspection of private premises; quarantine and compulsory vaccination; regulation of interments; regulation of sale of foods, and prior inspection of animals killed for food.

"The municipal police are made to keep the streets clean, and garbage is burnt in the open. A proposal for the appointment of a sanitary inspector was before the consejo at the time of my visit, but had not yet been acted upon. Records and reports are properly kept.

"*Alfonso.*—The board of health of this town, with which the former municipalities of Bailen and Mendez Nuñez are now fused, consists of Raimundo Jeciel, president; Lorenzo Angeles, elected member, and Moses Flynt, school-teacher. The president studied two years at Santo Tomás, and is a pharmacist in addition, having been an employee of the druggist Zobel in Manila.

"The ordinances provide for sanitary inspection of private premises; notification of births, deaths, and contagious diseases; quarantine; compulsory vaccination; regulation of interments; regulation of sale of food products, and prior inspection of animals killed for food.

"The street in front of each dwelling is to be cleaned by the occupant of the dwelling; the plaza and market at the cost of the municipality. One sanitary inspector is provided for. Clerical work is well kept up.

"*Silang.*—The board of health of this town, with which the former municipality of Amadeo is now united, consists of Inocencio Cariaga, who held the same appointment in Noveleta for nine months during 1903 and was formerly an attendant in a Spanish military hospital; H. J. Hawkins, school-teacher, and Fausto Montoya, elected.

"The ordinances provide for sanitary inspection of private premises; quarantine; compulsory vaccination; regulation of sale of food stuffs, and prior inspection of animals killed for food.

"The president of the board of health had taken charge only about two weeks before the date of my visit, and had not become thoroughly accustomed to his new surroundings. The most conspicuous lack in the ordinances, in the matter of the regulation of interments, he promised to take up at once. The records of Silang proper for 1903 were complete and in fair shape, but those of the fused town of Amadeo were in utter confusion, due to the fact that the officials had been in jail during a part of the year on charges of complicity in stealing carabaos. On this account it has been necessary to omit Amadeo in the preparation of the mortality tables which form a part of this report.

"*Carmona.*—The president of the board of health is Mamerto de Leon, with two years at Santo Tomás and nearly two years, service in his present capacity. Perpetuo Mapanoo is the elected member. The school-teacher who formerly served as member of the board has been relieved, and the new teacher, Godofredo Ebing, has received no credentials as a member of the board of health.

"The sanitary ordinances provide sanitary inspection of private premises; quarantine; compulsory vaccination; regulation of sale of food stuffs; prior inspection of animals killed for food, and the regulation of interments.

"Each householder is expected to keep the street in front of his premises clean. Garbage is burned in the open. Carmona has a small isolated house reserved for use as a pesthouse. The clerical work is in good condition.

"*Corregidor.*—The presidency of the board of health has been vacant for some time, but it is now filled by the municipal president, Juan Medina, a man of good intelligence. The other members are Doctor Moncrieff, of the Corregidor Hospital; Gervasio Garrido, elected member, and Estanislao Alabastro, school-teacher. The president is assisted by one sanitary inspector.

"The ordinances provide for sanitary inspection of private premises; regulation of sale of food products; quarantine; and such other municipal legislation as is needed is promised for the near future. The records are in good shape.

"MORTALITY STATISTICS.

"The best commentary upon the sanitary condition of the province, as well as upon the intelligence, professional knowledge, and activity of the local health officials, will be found in

the results obtained by a study of the mortality statistics which are presented below in tabular form. The population figures are copied from the official census returns as furnished to the provincial office, and the mortality returns are in most cases taken direct from the municipal registers; in a few cases, from reports in the office of the provincial board of health.

"Death rate, by towns, for province of Cavite for 1903.

Town.	Population.	Total deaths.	Rate per 1,000.	Combined rate.
Cavite	4,495	198	44.05	
San Roque	6,158	253	41.05	42.71
Caridad	4,917	214	43.52	
Noveleta	2,362	122	51.65	
Rosario	6,608	297	44.94	51.31
Cavite Viejo	6,173	358	57.99	
San Francisco de Malabon	9,673	460	47.56	
Santa Cruz	8,801	230	26.13	37.35
Imus	12,790	790	58.52	
Bacoor	10,998	689	62.65	61.30
Dasmariñas	3,047	208	68.26	
Naic	9,235	481	52.08	
Ternate	2,460	130	52.84	52.24
Maragondon	7,201	304	42.22	
Magallanes	3,503	164	46.82	43.72
Alfonso	5,692	170	29.86	
Ballen	2,505	135	53.89	32.63
Mendez Nuñez	3,741	85	22.72	
Indan	11,978	557	46.50	
Silang	5,643	264	46.75	
Carmona	2,609	118	45.23	
Corregidor	703	23	32.72	
Total	131,472	6,219	47.30	

"Death rate, by months, for province of Cavite for 1904.

Town.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Cavite	10	13	11	8	7	12	13	7	13	21	20	63
San Roque	9	21	15	10	17	16	20	17	30	47	51	
Caridad	12	11	9	15	15	6	16	31	30	30	28	11
Noveleta	4	4	9	4	6	3	7	7	8	10	11	49
Rosario	43	32	32	12	14	9	28	21	43	29	34	
Cavite Viejo	26	28	33	18	20	21	31	41	45	56	39	
San Francisco de Malabon	44	40	31	32	25	22	40	85	34	32	25	50
Santa Cruz	10	15	23	17	18	14	32	27	27	23	24	
Imus	45	47	41	52	59	58	72	79	60	97	80	69
Bacoor	35	31	43	40	35	41	46	64	83	147	55	69
Dasmariñas	12	14	15	15	8	14	11	17	17	30	32	23
Naic	44	41	49	28	38	24	45	52	66	45	21	28
Ternate	15	19	8	6	6	16	11	16	12	12	9	
Maragondon	33	27	29	35	31	28	36	22	27	13	11	12
Magallanes	19	20	26	18	16	9						
Alfonso	14	16	11	17	23	16	12	6	15	7	11	12
Ballen	15	12	7	8	4	9	25	16	15	11	6	7
Mendez Nuñez	13	3	3	3	3	6	7	10	7	14	10	7
Indan	76	55	69	38	74	59	42	35	40	29	19	21
Silang	29	20	22	27	27	23	27	17	24	24	11	13
Carmona	12	13	17	12	10	4	10	9	5	10	9	7
Corregidor		2	1	2	1	4	3	1	1	2	4	2
Total	520	484	504	417	457	414	545	595	614	701	521	454
Rate per 1,000 (about)	46.6	48.2	45.2	38.6	40.9	38.2	48.8	53.3	56.9	62.8	48.3	41.0

"The birth rate slightly exceeded the death rate for the year. I have counted 6,383 and lack the figures for an occasional month in individual towns, which I estimate would bring the figures up to, in round numbers, 6,500.

"These figures are merely approximate, as it has been the custom in many towns to copy the records of the parish church, and, in fact, some towns frankly report not the number of children born, but the number baptized. It is more than likely that the same cause lessens the value of the death lists, particularly in the matter of giving the cause of death, and it is hard to see how this can be helped, in view of the large area covered by the municipal organizations and the unwillingness or inability of the municipality to pay horse hire for the president of the board of health.

"*Infantile convulsions.*—By far the largest single contributor to the death rate is this, which is variously entered in the death reports as convulsiones infantiles, eclampsia, and alferecia. These terms are apparently used as catch-alls for the infantile mortality from all causes, as deaths under 2 years of age from any other cause than these and gastro-enteritis are seldom met with in the registers. Infantile convulsions furnish nearly one-third of the entire mortality and reach to 30 per cent of the birth rate. The figures are shown in detail in the following table:

Town.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Cavite	2	6	5	3	1	4	4	2	2	6	9	27
San Roque	3	6	5	4	2	2	4	5	14	14	30	
Caridad	6	5	2	3	2	2	7	10	15	15	16	9
Noveleta	1		4	1	2	2	4	4	2	1	10	35
Rosario	16	5	4	2	3		17	6	18	11	20	
Cavite Viejo	3	3	7	4	10	8	18	30	26	25	25	
San Francisco de Malabon	9	7	6	6	11	7	10	8	4	6	8	25
Santa Cruz	2	7	8	6	6	8	11	7	15	12	13	
Imus	15	16	15	19	23	22	33	38	21	28	28	38
Bacoor	19	12	17	16	14	14	18	27	18	35	28	38
Dasmariñas	2	2			4	4	3	4				
Naic	20	11	13	4	13	8	18	19	13	13	9	14
Ternate	2	4	3		1	2	7	4	3	4	1	
Maragondon	3	3	4	13	10	7	9	9	8	6	4	2
Magallanes	1	7	4	2	5		2	4	7	2	6	3
Alfonso	4	8	5	5	7	6	4	6	3	3	5	6
Bailen			3	1		2	2	1	2	2		1
Mendez Nuñez						1	2	2		1	1	2
Indan	18	18	13	12	9	11	11	14	11	6	4	10
Silang	7	5	3	6	3	5	3	3	3	3	2	3
Carmona	4	2	3	5	3		3	4	1		4	
Corregidor		2		1	1		1		1	1	2	2
Total	137	129	124	113	130	115	191	207	187	193	225	215

" Total, 1,966, or 14.95 per thousand.

"*Fevers.*—These are next in importance, as contributing to the death rate, to infantile convulsions. Scattered cases of typhoid fever are reported, 31 in all for the province. One town, Maragondon, reports 39 deaths from catarrhal fever and 7 from fevers in which differential diagnosis was not made. The bulk of the deaths from fever are reported as from malaria in various forms and as from calentura. It is noticed that Ternate, Magallanes, Mendez Nuñez, Silang, and Carmona report no other form of fever than calentura, while eleven towns return no deaths from this cause. Of the towns which report both malaria and calentura, in two, Santa Cruz and Indan, there is no apparent difference in the seasonal incidence, while in Dasmariñas and Bailen the monthly incidence is in inverse proportion.

"The figures are:

CALENTURA.

Town.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Santa Cruz							5	3		3		
Das Mariñas									6	12	8	
Ternate	10	5	2	2	2	2	1	4	5	6	4	
Maragondon	2					3						
Magallanes	9	2	6	8	4	3	5	2	2	3	2	1
Indan	16	7	15	9	13	10	4	2				
Bailen		3		3	2	2	6	2	3	1		3
Mendez Nuñez	9	3	2	3	1	5	3	6	3	1	7	5
Silang	14	8	11	13	13	9	14	8	8	8	4	7
Carmona	1	4	5	2	4	2	3			2	4	2
Total	61	32	41	40	39	36	41	29	27	36	29	18

MALARIAL DISEASES.

Town.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Cavite	1	2	1			1	1		1	1	1	2
San Roque		1				2	1	1	2	5	4	
Caridad			2		1			4	2	3	3	
Noveleta			1					1	2			
Rosario		4	1	4	7	3	5	3	8	5	3	
Cavite Viejo	7		3	2	1	2	1					
San Francisco de Malabon	17	20	5	9	8	6	13	13	15	11	1	7
Santa Cruz							1	1	3	2	2	
Imus	11	10	6	10	7	10	6	11	5	12	5	3
Bacoor	5	2	6	2	4	1	1	6	8	3		3
Das Marinas	8	10	12	12	4		5	6				4
Naic	3	3	3	4	9	2	16	8	10	8	5	6
Maragondon	10	3	2	2	6	7	3		4	2	1	4
Alfonso	7	4	4	8	6	6	1	3	5	4	2	3
Bailen	8	5	1	4								
Indan	29	19	23	10	32	22	14	6	12	10	6	6
Total	106	83	73	67	85	62	68	63	77	66	33	38

TOTAL DEATHS FROM FEVERS.

Malarial	818
Calentura	427
Typhoid fever	31
Others	46
Total	1,322

Or 10 per 1,000.

"*Smallpox.*—Nine towns in the province, whose mortality is shown in detail below, were seriously infected during the year:

Town.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Rosario	5	18	18	2									43
Cavite Viejo		14	16	4			1	1		1			37
Imus			3	3	4	5	19	10	13	12	11	6	86
Bacoor			1	7	5	4	4	7	2	18	4	6	58
Das Mariñas						1		3	3	2	1	6	16
Ternate	3	5	2	3	2	4		4					23
Maragondon	6	9	10	6									31
Magallanes	9	11	13	4	3	2	1						43
Bailen					2	5	15	12	8	9	3	3	57
Total	23	57	63	29	16	21	40	37	26	41	20	21	394

"Five towns, Cavite, Santa Cruz, Alfonso, Mendez Nuñez, and Corregidor, report no mortality from this disease. Eight report a mortality which is comparatively unimportant: San Roque, 7; Caridad, 6; Noveleta, 1; San Francisco de Malabon, 5; Naic, 9; Indan, 6; Silang, 4; Carmona, 1; total, 39; making a total for the year of 433, or about 3.27 per 1,000.

"It will be noticed that there was no serious mortality from this disease after June, except in the four towns of Imus, Bacoor, Das Mariñas, and Bailen. In these towns, the continuance of the disease month after month, and for a time with increasing incidence, shows a remarkable lack of success in handling the situation, the principal factors in which must have been a great laxity in the enforcement of quarantine, and neglect of vaccination, or inefficiency in its performance.

"*Gastro-enteritis and cholera.*—The mortality report of these two diseases is shown below. The two tables are presented side by side, and discussed jointly for the purpose of showing some interesting parallels. The figures for gastro-enteritis include all entries of 'gastritis,' 'enteritis,' and 'diarrhea.' Comparatively few of the cases which have been included in the 'cholera' table, were entered frankly as such. All cases entered as 'cholera nostras,' 'enteritis choleriforme' and 'fiebre pernicioso,' are included.

GASTRO-ENTERITIS.

Town.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Cavite	4		1		1	1	1		1		1	4
San Roque		2		1	1		2		1	5	1	
Caridad		1	1					3		1	3	
Noveleta					3					1		2
Rosario					1	1		2	2	2		
Cavite Viejo	2				5	1	5	6	9	9	2	
San Francisco de Malabon	1					1	5	32	7	3	2	
Santa Cruz					1	1	8	6			1	
Imus	4	6	2	10	7	8	4	9	12	7	3	10
Bacoor	1	5	2	3	2	4	7	9	34	19	7	12
Das Mariñas												6
Naic			5	1	1			6	5			
Ternate									2			
Maragondon							5	1	7	1		
Magallanes				1	1				1	2		
Alfonso		2		1	3				1	2		
Mendez Nuñez								2		9	1	
Indan		1	1	1	1		4	3	4	1		
Silang			1		1		3		3	2		
Carmona	1	1	1									
Total	13	18	14	18	28	17	44	79	89	64	21	34

"*Cholera.*—None reported previous to May.

Town.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Cavite	1				2	1		
San Francisco de Malabon				16				
Imus						17	1	2
Bacoor						48		
Das Mariñas		6			5	8	15	4
Naic					23	6		
Ternate		2						
Maragondon	1							
Corregidor		1						
Total	2	9		16	30	80	16	6

"The total for gastro-enteritis is 439, or 3.34 per 1,000, and for the group which I have classed as cholera, 159, or 1.29 per 1,000.

"In respect to the mortality attributed to gastro-enteritis, the towns of the province at once divide into two groups, one comprising the towns of Imus, Bacoor, Cavite Viejo and San Francisco de Malabon, which are grouped geographically, as well as for statistical study; the other including the remainder of the province. The first group reports a total of 274 deaths from gastro-enteritis, or 6.88 per 1,000; the remainder of the province reports only 162, or 1.76 per 1,000, so that the mortality of the first group from this one cause is nearly fourfold that of the remaining towns. Cavite, which shows the highest mortality of the second group, only reached to 3 per 1,000.

"Of the four towns of the first group, it is to be noticed that Bacoor, which reported only 17 deaths from gastro-enteritis during the first six months of the year, reported 7 deaths in July, 9 in August, 34 in September, and 17 in October, together with 48 attributed to cholera nostras. San Francisco de Malabon, which had reported only 2 deaths from gastro-enteritis from January to June, reported 5 in July and 32 in August, together with 16 deaths from suspected cholera. Cavite Viejo, which had reported only 8 deaths previous to July, reported 29 in the four months from July to October, inclusive. Imus, which was the only town in the province, with the single exception of Bacoor, to show a considerable mortality from gastro-enteritis during the first six months of the year, showed a still further increase, although slight, during these months, and at the same time reported 17 deaths from suspected cholera in October.

"Turning back now to the statistics for infantile convulsions, three of this same group of four towns, San Francisco de Malabon being omitted, show a considerable excess mortality from this disease also, the figures being 23.60 per 1,000 for this group, against 12.38 for the remainder of the province, as a whole, and 18.71 for the next highest town. Then, likewise, and markedly in Cavite Viejo, and to a less extent in Imus and Bacoor, the highest incidence of infantile convulsions occurred in the same months as the highest incidence of gastro-enteritis, and also the cholera incidence. I feel, therefore, that the internal evidence furnished by these tables, although purely circumstantial, is sufficiently complete to warrant the following conclusions:

"1. Sporadic cases of cholera occurred in Imus and Bacoor during the months from January to June, inclusive, which were not diagnosed as such.

"2. From July to October, inclusive, the number of cases increased almost to epidemic proportions, although the majority of the cases appear still to have been unrecognized, and spread to the neighboring towns of Cavite Viejo and San Francisco de Malabon.

"3. That a large portion of the mortality of this group of towns attributed to gastro-enteritis and infantile convulsions should be considered as due to cholera; certainly so much of it as is in excess of the rate of the next highest town, and probably all in excess of the average rate of the province.

"The revised cholera statistics for the group of towns above mentioned, including excess of deaths attributed to gastro-enteritis and convulsions of children, over rate of next highest town, are as follows:

	Imus.	Bacoor.	Cavite Viejo.	San Francisco de Malabon.
Reported cholera	20	48		16
Gastro-enteritis	39	70	20	21
Infantile convulsions	57	50	43	
Total	116	168	63	37
Rate per 1,000	9	15.3	10.2	3.9

"The revised cholera statistics for the group of towns above mentioned, including excess of deaths attributed to gastro-enteritis and convulsions of children, over average rate for the province, are as follows:

	Imus.	Bacoor.	Cavite Viejo.	San Francisco de Malabon.
Reported cholera	20	48		16
Gastro-enteritis	56	86	28	34
Infantile convulsions	137	119	82	
Total	213	253	110	50
Rate per 1,000	16.4	23	17.8	5.2

"These revisions raise the figures for cholera for the entire province to 459, or 3.49 per 1,000 for the lower calculation, and to 701, or 5.33 per 1,000 for the higher.

Tuberculosis.

Town.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Rate per 1,000.
Cavite	2	1	2		1	1	1	1	1	1	1	3	3.3
San Roque	1	2	3	1	3	2	2	4	3	10	1		5.2
Caridad	2	1	1	1	3	2	2	3	1	4	3		4.5
Noveleta			4	2		1	1	1	2	4	1	4	8.5
Rosario	1	2	4	1	2	1	1	2	2	1	4		3.3
Cavite Viejo	4	7	3	5	1	5	3	2	5	6	5		7.5
San Francisco de Malabon	11	10	4	2	1	1	1	4	2	5		9	5.0
Santa Cruz			3	2	2		3	4	2	1	2		2.1
Imus	1				1			2		1	10	5	1.5
Bacoor		5	4	3	4	4	8	5	16	9	7	12	7.0
Das Mariñas	2			2		3	1	3	2	5	3	1	7.0
Naic	2	1	1	4	2		6	2	3	8	1	1	3.4
Ternate		1	1		1			2			2		2.8
Maragondon	2	2	3		1	2	2	4	3	3	5	2	4.0
Magallanes			1	2		1	2					1	2.0
Alfonso			1	1	1		2	1	1	1	1	1	1.8
Bailen			1			1		2					1.6
Mendez Nuñez	4		1						2	1			2.2
Indan	5	4	2	1	7	3	4	3	5	5	4	2	3.9
Silang	3	4	3	2	2	7	5	3	3	5	3	1	7.3
Carmona		2	1	1	2		1	2	1		1	6	6.5
Corregidor			1				1	1			1		5.7
Total	40	42	34	30	34	34	46	51	54	70	55	48	4.17

"In the towns of Noveleta, Bacoor, Cavite Viejo, and Das Mariñas, the rate was 7 per 1,000 or greater, and in Bacoor and Das Mariñas the heavy mortality attributed to this disease occurred in the months of August, September, and October, i. e., during the existence of cholera. The cases are not sufficiently numerous to allow of a safe generalization, and the return would not be suspected except in connection with the condition of affairs demonstrated in the discussion of cholera.

"*Dysentery.*—The towns of Noveleta, Bacoor, Carmona, and Corregidor report no mortality from this disease. The only noticeable features of this table are that the 7 deaths reported from Imus all occurred just when cholera was apparently declining; and that the largest monthly reports from Naic immediately precede a cholera outbreak there.

Dysentery.

Town.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Cavite					2				1			2
San Roque		3	1					2				
Caridad	1				1			1				
Rosario	3		1	2	1			3	3	2	1	
Cavite Viejo	1					2		1				
San Francisco de Malabon			1									
Santa Cruz								1				
Imus											7	
Das Mariñas							2		1			
Naic	2	2			1		3	7	4	1	1	
Ternate						1	2					
Maragondon		1	1	1	2		6	1			1	
Magallanes							1					
Indian	2		2		4	1	3	2	2	1		
Alfonso	1	4	1	1	1			3	1			
Ballen	2	3	1				1					
Mendez Nuñez										1		
Silang										1		
Total	12	13	8	4	12	4	18	21	12	6	10	2

The rate per 1,000 for the province is 0.93.

Beriberi.

Town.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Cavite									1	3		
San Roque									1	2	3	
Caridad							1		1	1	1	
Noveleta										1		2
Rosario		1							6	5	3	
Cavite Viejo							2	1		7	4	
San Francisco de Malabon		1										
Santa Cruz		1	1							3	1	
Imus											7	3
Bacoor	1		1	1		2	2	2	2	7	5	3
Das Mariñas			2									1
Naic				2				1		1	2	2
Ternate												
Maragondon			2	3			1	2				
Magallanes									2		1	
Alfonso							1		1	1		
Ballen		1										
Mendez Nuñez					1		1		2	1		
Indan		1	1		1			3	2	3	1	
Carmona			1					1				
Corregidor											1	
Total	1	5	9	6	2	2	8	10	18	35	29	11

Total cases, 137; rate per 1,000, 1.04.

"In addition to the above table, 39 deaths were reported from dropsy, 29 of which were from the town of Imus alone. These 29 cases were all reported previous to the fusion of Imus and Bacoor, and a consequent change in health officers. Previous to the change no deaths from beriberi had been reported from Imus, while immediately following the change dropsy disappeared from the mortality register and beriberi began to appear. Ternate and Silang report no deaths and are claimed to be free from the disease.

"DEATHS NOT INCLUDED IN PRECEDING TABLES.

"Of the 6,219 deaths occurring in the province during 1903, 5,286 are accounted for in the above tables. Of the remainder, a considerable number were attributed to old age, a proportion to results or accidents of parturition, and there were approximately 50 deaths due to accident or traumatism, about one-half of which were gunshot or bolo wounds, reflecting the disturbed condition of the province.

"ANIMAL DISEASE.

"Although a number of deaths of horses from glanders, and also of hogs, and a few carabao were reported during the year, the various municipalities were claimed to be free from animal disease at the time of my visits. Nevertheless, I believe it to be the case that there are scattered cases of glanders existent and that the disease never entirely dies out. The value of the sick pony in the eyes of the average villager constitutes a property interest sufficient to induce him to evade all efforts of the health authorities to stamp out the infection by the destruction of sick animals, as the owner of one can seldom be made to understand that it is worse than valueless, and regards the health officer as seeking to do him injury instead of conferring a benefit upon the community by the destruction of infected stock.

"SANITARY CONDITION OF TOWNS.

"The majority of the towns of this province, and those of most importance, are built on the coast plains. Cavite and Noveleta, with their barrios, and Bacoor, which is a barrio of Imus, are on ground from 2 to 3 feet above sea level, and in consequence are without sufficient drainage. The other towns are sufficiently elevated for purposes of practical drainage, while Indan, Alfonso, and Silang are on high rolling ground and enjoy a mean temperature probably 10° lower than the remainder of the province.

"The usual water supply is obtained from wells or springs outside built-up area and appears to be of fairly good quality. Naic depends upon a large creek, and Cavite and Noveleta have no other supply than wells within the populated area.

"The cemeteries were in most cases properly located. That at Carmona is too near the populated area and otherwise needs attention, which the municipal officials promised to give at once.

"Garbage and rubbish in all these towns seem to be promptly disposed of, as no collections of any size were seen, while the streets appeared clean. The gravest fault in the sanitary condition of the towns of this province is in connection with the disposal of human and animal excreta. Stables were usually in bad condition, and, except in Cavite proper, there are no other kind of closets except dry earth pits, which are shallow, ill-looked after, and many houses are not even provided with these. Cavite has a number of public midden sheds, built on the sea wall, with seat holes projecting directly over the water, and there are some stone vaults in the town."

SPECIAL REPORT ON SANITARY WORK IN THE CITY OF CEBU.

Dr. Arlington Pond, medical inspector, under date of August 22, 1904, makes the following report of work done by the provincial board of health of Cebu, Philippine Islands, and the municipal board of health of the town of Cebu from April 16, 1904, the date of his arrival in Cebu, until August 18, 1904, the date of his departure:

"The first week was spent in learning the situation and getting acquainted with the town authorities. Previous to April 16 there had been reported considerable friction between the boards of health of both province and town and the municipal authorities. The health work had been for several months in the hands of a committee composed of three American physicians and two Filipinos, whose work was supposed to be advisory. This committee was a great mistake and only increased the friction which already existed. It was found that everything in the way of sanitary work had been stopped for some time, due to stubbornness and misunderstanding on both sides. Had the time spent by each side in calling the other hard names been spent in sanitary work, and had the money appropriated by the insular government for this so-called 'executive committee' been spent in sanitary work instead of in salaries, much might have been accomplished.

"It can be seen that the first thing to be done was to restore harmony, if possible, and to get the assistance of the municipal authorities instead of their opposition. This was accomplished in a large degree by careful handling and decent treatment.

"MUNICIPAL BOARD OF HEALTH.

"There was practically no municipal board of health organization and no work was being done. The question of the hour was whether or not the municipality should furnish the doctor with a vehicle. The presidente said it was not only not customary but impossible for them to do this, as the town could not afford the expense. The doctor, supported by the executive committee, claimed it was impossible for him to do his work without one, and that his salary of 83 pesos Conant per month was too small for him to pay for the hire of one. Although a vehicle would have been of great assistance, it was quite possible for the doctor to get along without one, especially as there was no law to compel the town to furnish one. The doctor was informed that he must perform all the duties of his office or resign. He preferred to do the former and get along without a vehicle. Both sides had simply made this question of the vehicle an excuse for showing their ill feeling for each other, and the presidente's plea of poverty was equally as weak an excuse as was the doctor's, that he must have transportation because the distances were so great.

"As there were neither sanitary inspectors nor vaccinators in the town, a request for 5 of the former and 2 of the latter was made and granted, and daily inspections of the town and vaccinating were at once begun. The municipal prisoners, of whom there are usually about 30, were put at work on the streets and canals and a general cleaning up of the town began.

"LEPER HOSPITAL.

"Although Cebu was insanitary and bubonic plague was present, and there was friction between the different authorities, and no sanitary work was being done, these conditions were all secondary in importance to the leper situation. Unless something was done at once to improve the condition of the lepers suffering was sure to result. Two hundred and forty lepers were living in one stone building and two nipa barracks. The former was extremely insanitary and unfit for the purpose and the latter were in the last stages of decay and ruin. There was no fence around the place and no way of keeping the inmates confined, and as the hospital was only on the outskirts of Cebu the patients mixed freely with the people of the town. In view of this bad condition of affairs and the fast approaching rainy season, tents were immediately wired for to supply shelter for the ones living in the barracks. This was intended only as a temporary relief until they could be transported to Culion, which, it was understood, would be shortly. Later, when it was found that Culion would not be ready for some time, the building of a decent hospital was strongly advised. This recommendation was immediately acted upon, and as the result 6,000 pesos Philippine currency were made available for the purpose. Plans and specifications for a hospital consisting of two buildings, 300 feet long and 20 feet wide, made of nipa and bamboo on a frame of hard wood, with cook house and closets, and, most important of all, a fence 6½ feet high surrounding the whole place, were immediately drawn up by Mr. De Lano, provincial supervisor, and a contract entered into with D. C. Taton, an American resident of Cebu, for the construction.

"Bids were not advertised for, as it was wished to expedite the construction as much as possible. The estimates of some natives who had bid for the same thing during the time of my predecessor were so high that it was not thought best to consider them. For example, they had heard that the amount of the appropriation was 6,000 pesos, so their bids were within 3 or 4 pesos of that amount. They were bidding for the appropriation and not for the work. Although there were many delays, due to bad weather and inability to get labor, the hospital is now finished and ready for the accommodation of 300 patients, and as many as 400 if necessary. Comfort and protection are afforded to the inmates and protection to the people of the town. Cooked rations are furnished them now instead of the uncooked food as formerly. There should be a guard over the place, but it seems the constabulary are not available. A request was made to the provincial board, but they referred it to the municipal council, who returned answer that they did not have sufficient policemen. A guard is not absolutely necessary just at this time, but as soon as the news that they are to be sent to Culion gets circulated among the lepers it will be difficult to keep them confined without one. The provincial treasurer has given assurance that when that time approaches the guard will be forthcoming.

"After the removal of its present occupants to Culion the hospital can be rapidly filled again with others from Cebu Province, as well as from the neighboring provinces, although the filling of the hospital the second time will be a difficult matter in spite of the fact that there are over 1,000 lepers in the province, for when it is known that Cebu is but the half-way station for Culion it will not be so popular as it is now. The good quarters, good food, good clothes, and 20 cents a week make the place very attractive. But three or four years use, at least, can be got out of the place. The leper question in Cebu is of such great importance that if the board of health had not taken prompt action the Roman Catholic Church, through its head in that province, would soon have done so, and the results

would surely not have been gratifying to the ones responsible for the conditions. The old buildings occupied by these people were worse than one's imagination could picture them and beyond all possibility of repair, and it was only through the influence and watchfulness of Padre Fifimon Flores that the inmates did not leave.

"PROSTITUTION.

"The municipal council was induced to adopt the vagrancy ordinance, and with the assistance of the police a general round-up followed. The infected ones, of whom there were 55, were sent to the hospital, where they remained until cured. Most of the remainder took to cover and many of them left the province. As long as the police are vigilant public prostitution can be reduced to the minimum, but they are inclined to relax very frequently, so a big round-up every few months will be necessary.

"STREET CLEANING.

"The cleaning of the streets and the removal of garbage is let out by contract, and, as usual in these cases, unless carefully watched the service is very poor. The public dump was located on the water front, in the very heart of the business district and close to many residences, the occupants of which had frequently complained of the bad odor and the great number of flies, but without result. One of the first things done was to change the location of this nuisance to the outskirts of the town, where the contractor agreed to burn all refuse. He carried out this agreement every time his attention was called to it. This same street department has given the health authorities more annoyance than any other one thing in the health work of Cebu. Complaint after complaint was made to the presidente by not only the board of health but by private individuals. It was recommended to the presidente that the municipality have its own department, and it was figured out for him, showing where a complete outfit, better and more complete in every way, could be bought and run for a year for almost the same amount the city paid this contractor for his indifferent service, which amount is 6,000 pesos, and the cost of running the second year would be only half that amount, but he said that no change could be made until next year.

"The animals used on the garbage carts are the poorest of their kind. In June an examination was made of them by Doctor Glaisyer, veterinarian, board of health, and out of fourteen examined two were pronounced positive of glanders and the rest suspicious. The two positive ones were immediately ordered killed, which was done in the presence of the owner. These two animals were discharging enough pus from their nostrils every hour to infect every horse in the province, and they were being used daily. The killing of these two animals was followed by a letter of protest to the presidente, who forwarded it to the governor, who returned it to the provincial board of health for explanation. Evidently the explanation was satisfactory for nothing more has been heard of it. As there was no insular or municipal law covering these cases, and as it was desired to make a thorough examination of the remainder of the street department horses as well as of all the horses in town, an ordinance similar to the one in force in Manila was placed before the municipal council. A perfect storm of protest arose from the friends of the contractor (who, by the way, is a gentleman with a long 'pull') and the ordinance was bitterly opposed for two weeks on the ground that it gave the board of health too much power. Finally the thing came to a vote, and 9 voted in favor and 9 against it, the presidente casting the deciding vote in favor of its passage.

"In the meantime a wire had been sent to the central office of the board of health for mallein, for it was part of the agreement that before horses were killed for glanders they should react to mallein, and the answer said it would be sent as soon as a fresh supply could be made in the laboratories. A month later, in answer to another request for mallein, the chief veterinarian, board of health, said there was none on hand, so this entire work, over which such a hot fight had been waged, came to nothing on account of the lack of mallein. There is no doubt but that there are many cases of glanders in Cebu, and a veterinarian should be sent there to clean the place. The law is there waiting to be applied, and the presidente will assist in every way, if only for selfish motives, for he is the owner of several valuable horses. This constant keeping after the street department had the effect of improving the service, even though glandered horses are being used to pull the carts, but the inability of the board of health to obtain mallein made it more or less of a victory for the contractor, for his glandered animals are still alive.

"DEATH AND BIRTH CERTIFICATES.

"The registration of death and birth certificates has always been a source of friction between the municipal and health authorities, more from the general idea of opposing everything proposed by the latter than anything else. It was a small matter to secure the adoption of the same system of registration as is in use in Manila, and the presidente made himself responsible for the accuracy of the records.

"LICENSES.

"Licenses have heretofore been granted to anybody who had the price to pay for them, without regard to the sanitary condition of the prospective place of business. An ordinance was drafted and proposed to the town authorities, which made it obligatory to have the approval of the board of health to every license application before license could be issued. Also in the same ordinance was a clause giving the board of health power to close any place of business at that time running, or at any future time, if the place was insanitary and the owner refused to make the necessary repairs. This ordinance was passed as drawn in the original, and it gives the board of health great power for good, but a larger sanitary organization than Cebu has at present is needed to get the full benefit of the law, though, even with the present small force, a great deal of good has already resulted.

"MARKETS.

"Four months ago Cebu had two markets which were entirely inadequate in size and in very bad sanitary condition; to-day there are two new ones which, although not perfect, are excellent markets. The markets are inspected twice daily by the municipal doctor, who sees that no bad meat, fish, or vegetables are for sale. He also issues permits for the killing of all animals. Only old and decrepit animals, i. e., draft animals, carabao, etc., are supposed to be killed, and permits are given only for animals coming under those heads, but it was discovered that after the doctor had inspected an old, useless animal, and had given a permit for killing the same, the owners were substituting a good healthy animal in its place and the same old, useless one was being condemned every day. To stop this the doctor now writes a description of each animal to be killed and passes this description on to Mr. Dexter, who views the killing. Several times people have been caught trying to make a healthy animal fit the description of some old, broken-down one, for the killing of which a permit had been given. Although this practice of killing animals fit for breeding or for draft purposes, contrary to law No. 637 has been stopped in public, there is no doubt that it is being done in secret and that many good carabao are being slaughtered every day. This matter has been brought to the notice of the provincial treasurer.

"HOSPITALS.

"Cebu has two hospitals, one for infectious and contagious diseases and one general. Needless to say, they are of little value. The municipality spends enough money every year on these two hospitals to support one good first-class institution. Cebu would be an excellent location for a good fifty-bed district hospital with an American doctor in charge. Being centrally located it would be easy of access to the other provinces in that region, and civilians of all classes could get good hospital treatment without having to make the long journey to Manila. The municipality has signified its willingness to contribute the money they now spend for their municipal hospitals, which amounts to nearly 5,000 pesos yearly, to its support, and the province will give the land, besides supporting a certain number of beds. The remainder of the money necessary for its erection and support should come from insular funds.

"PROVINCIAL PRISON.

"The provincial prison is a relic of Spanish days, and is wholly inadequate for the number of prisoners it now contains. It is crowded out of all proportion to its air space, and beriberi is prevalent among both constabulary and prisoners. Recommendation has been made by Captain Nevill, senior inspector, and the undersigned for the repairs necessary to put it in good sanitary condition. These recommendations include the removal of all the constabulary but the necessary guard, and the building of a good hospital. They were approved by the provincial board, and ₱8,500 have been appropriated for the purpose.

"THE ESCOLTA DISTRICT.

"The Escolta district was, in Spanish days, the principal business part of the town, and in it were located Cebu's best buildings. In 1898, during an engagement between the Spanish gunboats in the bay and the insurgents on land, the whole district was destroyed by fire, leaving only the stone foundations and walls of the buildings. After the fire, instead of rebuilding or cleaning out the ruins, squatters were allowed to creep in and erect shacks of any material they could lay their hands on, and these ruins became in time the living places of hundreds of people whose main object in life seemed to be the collection of as much filth as the district would hold.

"Three years ago plague broke out in this section and has existed ever since, besides spreading to other localities. Many attempts have been made at different times to get

the district cleaned out, but there was so much opposition each time that it was given up. After many conferences with the presidente on this subject, he was finally induced to issue an order to all the owners of walls and shacks to have them removed within ten days. At the end of the allotted time not a wall or shack had been touched. Knowing that it would be hopeless to do any more talking on this subject, Inspector Dexter, with the permission of the presidente, was ordered to take the municipal prisoners and begin work at once. With the taking down of each shack and each piece of stone there was a great protest and a consequent interruption in the work, and although his office was besieged by crowds of crying people the presidente stood firm and allowed the people to go on. It took three months to get these shacks and walls out, but one who had seen the place six months ago would hardly recognize it now. As the stone in all these walls was calcined, and not suitable for further use for building purposes, the municipality has taken it to use on the roads. The military were also allowed to have much of it. To-day there are only two walls standing, and they are evidences of the only time the presidente openly opposed the board of health. They are the property of a Chinese mestizo named Veloso, a personal friend of Presidente Rodriguez. Veloso claims the walls can be built upon, and the presidente apparently believes him. On the other hand, the provincial supervisor says they are not strong enough to be used again in a building. While the public health is really not jeopardized by their being there, still they are not things of beauty and should come down. Knowing that talking would do no good, I had an idea that he could get them down without the knowledge of the owner and that the talking, if any was to be done, could come afterwards. Acting on this idea, Dexter was sent there with instructions to get them down at once and refer everybody to the board of health. The work had no more than started when it was discovered and the fight was on. Finding appeal to the board of health was of no avail, they appealed to the governor of the province, who promptly became interested in something which was none of his business and ordered the work stopped by the presidente. As the attempt of the board of health to get the walls down was more or less of an arbitrary proceeding, there was nothing else to do but stop work with the hope of finding another way. In the meantime I was ordered to Manila and the walls are still standing.

"Next to the building of the leper hospital the cleaning out of this Escolta district is the most important work done in Cebu by the board of health. It is a large district, covering several blocks, and to clean it out took a tremendous amount of patience and persistence. Chief Sanitary Inspector Dexter was personally in charge of the gang of men who did the work, and he deserves great credit.

"VACCINATION AND SMALLPOX.

"The two vaccinators appointed by the municipality worked steadily with an average number of 60 vaccinations a day for each man, until the arrival of Doctor Biggar and his corps of insular vaccinators, but their results were poor, for only about 3 per cent of the total number were successful. Fortunately there have been but few cases of smallpox in the town for the last four months. In the province—i. e., outside the town of Cebu—there were reported cases and deaths as follows:

Month.	Cases.	Deaths.
January	348	145
February	426	78
March	253	84
April	148	78
May	118	26
Total	1,293	411

"There has been a steady decrease in the number of cases during June, July, and August, due to the presence since March of three insular vaccinators in the worst infected towns. The province should have its own corps of vaccinators, 1 to every 100,000 inhabitants, with one inspector of vaccination, all under the direct control of the president of the provincial board of health, who should be responsible for their work. With the exception of the work of vaccinating, there is practically no sanitary work to be done in the province outside of the town of Cebu, as the lack of medical men makes municipal health organizations impossible. During the last session of the normal school I addressed the teachers of the province on the subject of vaccination, in the hope of enlisting their assistance in the matter of each teacher vaccinating his or her own school. The promise of this assistance was given when school should reopen, but the arrival of Doctor Biggar with his own men made it unnecessary to call upon them.

"BUBONIC PLAGUE.

'Bubonic plague has been endemic in Cebu for the last three years, and, while it has never become epidemic, it has at times been so bad as to cause alarm. In the last four months there have been three cases. The first two occurred within two weeks of each other, while two months elapsed before the third case occurred. There was no traceable connection between any of the cases, as they occurred in different sections of the town. The last case occurred on August 18, the victim being a Moro sailor on a small coasting schooner in the bay, and appeared seven days after the arrival of the schooner in port. All efforts to trace the sources of the individual cases have been fruitless. The gradual improvement in the sanitary condition of the town will probably wipe out the disease, but if dirt and filth get the upper hand there will be an epidemic.

"RINDERPEST.

"Since January rinderpest has caused the death of nearly 2,000 animals in four towns on the east coast north of Cebu. A party of inoculators, under a board of health veterinarian, was sent to the infected district in June last, but their results were so poor that they were withdrawn. The death rate among the healthy animals inoculated by the simultaneous method was many times higher than the death rate from the disease. Whether the fault was with the method of inoculation or with the serum I was unable to determine from the investigation he made at Bogo and Codmon. Whatever the cause, the results were unfortunate, for the disease is still epidemic and there is a focus of infection large enough to infect the whole island.

"Under the present régime it is difficult to see where any more permanent sanitary improvement can be made. The work which has been done was made possible by the assistance of Presidente Rodriguez and the fact that it would cost the town practically nothing; rather the town was the gainer by as much as the value of the stone taken from the Escolta district. The improvements now needed badly are the most important and most expensive. They are a water supply and a sewer system. The former is at present obtained from wells, while the latter consists of a few open drains. To get these things there must be more money in the treasury, and to get more money in the treasury the town must be incorporated, with a charter on lines similar to the charter of the city of Manila. That, and that only, will be the salvation of the town from a sanitary standpoint. It seems to me that the town of Cebu is a bad business organization and that all the money raised goes for salaries of its officials. With intelligent and honest officials at the head of the municipal government men who are interested in the welfare of the town and not too much in their personal welfare, Cebu can be made one of the healthiest and prettiest towns in the Philippine Islands. Cebu offers a great field for sanitary work, but it must be directed by an American doctor. The present salary of the president of the provincial board of health is only $1,500 United States currency per year, and that is too small for an American to work for. If it could be raised to $1,800 an American doctor could be found to take the place."

REPORT OF SPECIAL SANITARY INSPECTION OF THE PROVINCE OF MISAMIS.

Dr. Paul C. Clements, medical inspector, under date of January 12, 1903, reports as follows:

"I have inspected the following towns of the province of Misamis: Oroquieta, Jimenez, Loculan, Misamis, Cagayan, Iponan, Opol, El Salvador, Alubijid, Agusan, Tagoloan, Balingasag, Lagonlong, Salay, and Talisayan. The towns of Tacloban and Surigao were investigated with regard to building or site for a hospital.

"PROVINCIAL BOARDS OF HEALTH.

"The provincial board of health of Misamis Province, as at present organized, consists of Dr. Francisco Javier, president; Mr. Eugene Barton, supervisor-treasurer, and Señor de Leon, president of the municipal board of health of Cagayan. The clerical work of this office is well systematized; communications received and copies of communications sent are properly docketed; reports from municipal boards are in accessible form, and the circulars, etc., of the insular board of health are promptly communicated to the municipal boards, in a Visayan translation, when necessary. The local regulations of the provincial board, as formulated for the approval of the commissioner, appear to be well adapted to the existing conditions of the towns of this province. The reports received from municipal boards include transcripts of the register of births, deaths, and marriages, and of the list of persons vaccinated, which are forwarded monthly; contagious diseases, forwarded

daily from points in telegraphic communication, and as opportunity serves from those towns not enjoying such facilities, and such special reports as are called for. These reports are received from all except two municipalities with such regularity and promptness as the conditions mentioned below will allow.

"One of these delinquent municipalities, Gingoog, has been united to Talisayan under the act reducing the number of municipalities, and the other, Initao, is of so little importance, commercially, that it is seldom visited by steamers, and its only connection with the remainder of the province is by a long stretch of very bad road. Pending the assignment of insular vaccinators to this province, and on account of the presence of smallpox in several of the pueblos, a number of temporary appointments as vaccinators were made by the provincial board of health. One of these provincial vaccinators spent the first half of November in Oroquieta, vaccinating during that time all, or nearly all, of the children, after which he went into the next town, Jimenez, but did no work there on account of a fracture of the bones of the forearm, this injury being received by being thrown from a horse. Another worked in Lagonlong during the greater part of November, and in Talisayan up to the time of my visit there January 1 to 4. A third was encountered in Balingasag December 13, where he had been at work for several weeks. Of the vaccinations in Oroquieta, very few were successful, and the same is true with regard to the early work in the other towns, and it is attributed to the fact that the virus used had been sent by mail and was exposed in transmission to too high a temperature. Fresh virus, received later, gave good results.

"MUNICIPAL BOARDS OF HEALTH.

"*Oroquieta.*—No organized board in this town. Susano Neri, locally known as the 'mediquillo' receives 25 pesos per month for attendance on the poor and municipal police. His knowledge is limited to that acquired during a service of less than two years as attendant in a Spanish military hospital. Nothing has been done here except to clean up the streets and yards during the cholera epidemic. The reports to the provincial board are attended to by the municipal secretary, who also keeps up the register of births, deaths, etc., in moderately good shape.

"*Jimenez.*—Juan Galindo, a practicante with only local experience, is acting as president of a local board of health. The registers here are likewise kept by the municipal secretary, but the death register is incomplete, and shows only a portion of the death records forwarded to the provincial office, which were seen subsequently. No record of anything accomplished by this board.

"*Loculan.*—The board of health consists of Cayetano Saarenes, a young man without training, but of good intelligence, and the councilmen. The municipal council of this town, previous to the invasion of cholera, adopted ordinances providing for quarantine against infected points, and for the cleaning of streets and yards; and during the epidemic directed the disinfection and burial of cholera excreta, and the boiling of food and water; notwithstanding which, this town shows the highest percentage of deaths from cholera which was encountered in the entire province. The registers here are well kept. This town is now incorporated with Misamis.

"*Misamis.*—The board of health consisted of Mariano Wamdo, practicante, who claims four year's study in Manila; Mr. Gunn, school-teacher, and Palacio Calalong, a councilman. Mr. Gunn has been withdrawn since the date of my visit. This town has some ordinances regarding general cleanliness and quarantine, but little effort is made to enforce them, except during epidemic seasons. The practicante puts in a day or two occasionally in sanitary inspection work, but devotes the greater part of his time to the poor, and vaccination. He has practiced arm-to-arm vaccination steadily during the past few months.

"*Cagayan.*—The president of the municipal board of health of Cagayan is Señor de Leon, who has a 'titulo' as 'cirujano ministrante.' He likewise acts as a member of the provincial board. The regulations are enforced here to a greater degree than elsewhere in the province, due to the personal supervision of Doctor Javier. The municipalities of Iponan, Opol, El Salvador, and Alubijid have been incorporated with Cagayan.

"*Iponan.*—The municipal board here consisted of Lope Abrera, president, the municipal secretary, a councilman, and a native school-teacher. The records and reports are in fair shape. Now incorporated with Cagayan.

"*Opol.*—This town has a president of board of health who does not speak Spanish, and whose name I failed to note. The records are in fair shape, and include lists of 1,866 persons vaccinated during the present year, of which rather more than half are estimated to have been successfully vaccinated. Now incorporated with Cagayan.

"*El Salvador.*—This town is now incorporated with Cagayan. The records are in better shape than in any other town in the province, with the exception of Cagayan, and include about 1,300 vaccinations, mostly children, for 1903; estimated 753 successful.

"*Alubijid.*—No board of health. Registers attended to by municipal secretary. List of deaths apparently complete, but no attempt to assign cause of death. Now incorporated with Cagayan.

"*Agusan.*—Records not seen on account of absence of officials in Tagoloan, with which town Agusan is now incorporated, my visit falling on election day.

"*Tagoloan.*—The president of the municipal board of health is Melecio Alquitela, who served two years and nine months as attendant in the Spanish military hospital at Iligan. He has good intelligence, and a fair understanding of his duties. Has carried on vaccination work since June 20, 1903. Seven hundred and seventy-three vaccinations up to date of inspection. Some inspection work has been done, and one or two prosecutions for violation of sanitary regulations which have been adopted by the municipal council.

"*Balingasag.*—The president of the board of health here is Sancho Babiera, who has a 'titulo' from Santo Tomas as 'cirujano ministrante.' He has served in this capacity about six months. The regulations of the board of health have been adopted by the municipality, and seven convictions have been secured for violations. Vaccination was begun in September, but about 1,000 vaccinations in this month and October were without effect. In November and December, 1903, the work was continued with fresh virus. Number vaccinated in these two months 990; successfully, 456. Jasan, Lagonlong, and Salay have been incorporated with this town.

"*Lagonlong.*—This town has been incorporated with Balingasag, and the records had been sent to that place before I visited Lagonlong. There has been a temporary organization here, but I was unable to learn that anything had been accomplished.

"*Salay.*—Now incorporated with Balingasag. In addition to keeping the required records and making copies for transmission to Cagayan, the work accomplished consists principally of about 200 vaccinations.

"*Talisayan.*—The vice-president has looked after sanitary matters here. Not much is being done, although the records are well kept. Local vaccinations, 336, with only 8 successful. Provincial vaccinator arrived November 23, 1903, and up to December 31, 1903, had vaccinated 827, with 403 successful results.

"Of the above-mentioned towns only Oroquieta and Jimenez remain unaffected by the fusion of municipalities which went into effect on January 1, so that Misamis, Cagayan, Tagoloan, Balingasag and Talisayan, and likewise Mambajao, are now without even temporary boards of health, on account of the effect of this act, which will also affect future sanitary work on account of the large areas now embraced in single municipalities. Thus Cagayan now has, as barrios, four towns along the coast to the west, the last of which is 15 miles from the seat of the municipal organization. Balingasag now includes Salay, 10 miles to the north, and Jasan about 15 miles to the south; Gingoog, which has been added to Talisayan, is distant a six-hour ride, and parts of Camiguin Island, all of which is now included in the municipality of Mambajao, are almost a day's ride from that place. Under these circumstances, it is practically certain that the towns which have been converted into barrios, will receive even less attention than formerly, although, on the other hand, in most cases they will be brought under the jurisdiction of sanitary officers whose knowledge is greater than that of the men whose offices have just been vacated. It is desired, however, that some arrangement be effected by which the municipal board of health will have a representative in each barrio, and this can probably be best done by causing the teniente of each barrio to act as sanitary inspector. It should also be made the duty of the president of the board of health to visit each barrio at least once a month.

"One of the principal factors in hampering the work of the provincial board of health is the lack of regular communications. Thus, on the Misamis side of the province the only communication with Cagayan is by the coast guard service, twice a month, and the points at which these boats do not touch are very badly off indeed. The relations of this portion of the province are much closer with Cebu than with Cagayan. It is due to these conditions that the regular monthly reports are usually from four to six weeks in arrears.

"The data afforded by these reports are vitiated to a considerable extent by the lack of diagnostic ability from which even the best of the practicantes suffer, and by the prevailing habit of depending upon the padre to report events which it should be the duty of the head of the family to report. In some towns births are only registered when the baptism is performed, and in one, Jimenez, the entire vital statistics are taken bodily from the parish records.

"During this tour I observed the general need of blank forms for vaccination register, for register for contagious diseases; of report forms for contagious diseases, for vaccinations as well as the regular monthly reports of vital statistics and vaccination certificates. These report forms should be in the shape of loose sheets ruled and printed to correspond to a page of the register, and the reports rendered in the form of transcripts of the various registers.

"NOMINATIONS FOR PRESIDENTS OF MUNICIPAL BOARDS OF HEALTH.

"In every case I have found the temporary appointments made by the provincial boards to represent the best available material. With the exception of the army contract surgeon, the president of the provincial board of health is the only graduate physician in the prov-

ince, and only four towns can boast a practicante who deserves the title. I submit below a list of those I would recommend for appointment, with an efficiency report on those who have already served in this capacity, based upon training, service, and general intelligence. On account of the operation of the fusion act, the remaining municipalities are, with one exception, entirely without sanitary officials, and the appointments should therefore be made at the earliest practicable date.

Town.	Name.	Title.	Efficiency.	Remarks.
Cagayan.....	Señor de Leon.....	Practicante; diploma.....	70	President municipal board of health, Cagayan, since organization.
Misamis.....	Señor M. Wando.....	Practicante; no diploma .	70	President board of health since organization.
Jimenez.....	Señor J. Galindo	do.....	50	Served since organization.
Oroquieta.....	Señor S. Neri.....	do.....	50	
Tagoloan.....	Señor M. Alquitela ..	do.....	60	Served under former municipality.
Balingasag.....	Señor S. Babiera	do.....	70	6 months' service, former municipality.
Talisayan.....	Señor B. Pelaez.....	Practicante.....		College of education in Manila.

"With regard to the town of Mambajao, I would recommend that the former president of the board of health of that place be reappointed for the new municipality. I did not reach that town on account of heavy weather and have not his name, but he has a diploma as 'cirujano ministrante' and is highly spoken of in Cagayan. I am unable to make recommendations with regard to appointments in Initao and Langaran, except that Doctor Javier's recommendations be received.

"HYGIENE AND SANITARY CONDITION OF TOWNS—CUSTOMS AND HABITS OF THE PEOPLE IN REGARD TO SANITATION.

"Along the coast of the province runs a strip of flat land from 3 to 15 feet above the tide level, and varying from one-half to 3 miles in width, backed by abrupt hills rising into the interior. The hills are only inhabited by a sparse population of 'montescos,' whose villages rarely contain more than six or eight huts. The Visayan population live entirely upon the beach, except in the towns of Cagayan and Iponan, which are on the banks of small rivers and are inland 3 and 1½ miles, respectively. With the exception of Tudela, a barrio of Misamis, Alubijid and Opol, barrios of Cagayan, and the larger part of the town of Jimenez, which are located on small, irregular hills, all of these towns are built on flat land and are without drainage. During the rains much of the flat belt is almost marshy in character and it rarely becomes absolutely dry. There are rice paddies near every barrio, and stagnant pools abound.

"*Water supply.*—Only two or three of the towns visited depend upon wells—Opol almost entirely—and Jimenez and Alubijid to a considerable extent. Nearly all the towns are located at the mouths of small streams, which furnish good water on account of the absence of sources of pollution in the hills. Balingasag has a water main laid from a mountain stream, and public fountains, which were constructed during the Spanish rule; but the system is not in operation for want of some repairs said to require but little time or trouble. The provincial board of health has issued regulations directing that laundering and all other domestic operations tending to pollute the water of these streams be performed in the part below the towns, and that water for domestic purposes be obtained above the towns, and these regulations are generally observed.

"*Disposal of excreta.*—Shallow earth pits are the only means used.

"*Habits.*—The general lack of cleanliness and the custom of eating from a common dish and taking the food with the fingers appear most objectionable from a sanitary standpoint. Sick persons are usually visited by all of the neighbors, and this is a principal factor in spreading contagious diseases.

"*Subsistence.*—The diet list includes sea foods, chickens, rice, bananas, camotes, and occasionally maize, and some native fruits. With so limited a list, and the usual lack of thorough cooking, small power of resistance to disease is to be expected.

"PREVAILING DISEASES.

"*Malaria.*—The proportion of the ordinary death rate, aside from the cholera epidemic, attributed to calentura, typhoid fever and malaria varies from 50 to 90 per cent, and I was told in every town that nearly all existing sickness was malarial in character. It was

noticeable that in proportion to the intelligence of the officials the deaths attributed to typhoid fever increased.

"*Beriberi*.—No town is absolutely free from this disease, and the 76 deaths during 1903, which were found attributed to this cause in towns representing about one-half the province, would indicate the probable existence of 500 cases in the province.

"*Dysentery*.—During the year 1903, deaths from this disease were recorded as follows: Oroquieta, 14; Iponan, 5; Opol, 4; Cagayan, 14; Santa Ana, 11; Tagoloan, 1.

"Occasional cases occur in all towns.

"*Tuberculosis*.—The only noticeable death rate from this disease was in Cagayan, 22; El Salvador, 10.

"Most towns had from 3 to 6 cases recorded. These are believed to be far below the true figures, as some deaths from this disease are undoubtedly attributed to calentura.

"*Scarlatina*.—Entered as a cause of death only in Cagayan, 20 cases during 1903, and in Balingasag, 17 cases. A few cases are still existing in both towns.

"DEATH RATE.

"The following statistical table, covering ten towns of this province for year from July 1, 1902, to June 30, 1903, are believed to be fairly representative of the entire province. This period covers practically the entire cholera epidemic.

Town.	Deaths per 1,000.		Town.	Deaths per 1,000.	
	Cholera.	Other diseases.		Cholera.	Other diseases.
Cagayan	67	40	Jasan	23	33
Opol	50	28	Balingasag	42	38
El Salvador	29	27	Salay	21	9
Loculan	78	27	Talisayan	38	14
Santa Ana	41	28			
Tagoloan	27	14	Average	42	26

"EPIDEMICS.

"*Cholera*.—The total number of deaths from this epidemic which I was able to enumerate is, in round numbers, 2,700, which does not include Camiguin Island and six small towns on the mainland, and which probably falls somewhat short of the actual number in the towns included. Few data are available for a detailed history of the epidemic except the entries in the death register. These show Cagayan and Balingasag to have been invaded almost simultaneously in the latter part of September, 1902, the infection probably coming from Cebu, as the trade relations of the province are entirely with that port. Talisayan, invaded October 10, was likewise infected from Cebu, either direct or through Mambajao. From Cagayan the infection spread to Iponan, October 3, and to Opol and Salvador on the 14th, and from Salvador to Alubijid. Santa Ana and Lagoloan only became infected on the 11th and 15th of November, respectively. Salay, invaded October 23, and Jasan, October 28, were infected from Balingasag. In all of these towns the epidemic reached its height in about two weeks and began to decline at the end of a month, disappearing from Opol, Santa Ana, and Lagoloan the last of December, from Jasan during January, from El Salvaldor, Salay, and Talisayan during February, and from Cagayan and Balingasag in March. It reappeared in Balingasag and Salay in May, with sporadic cases in one or two other towns. All these towns were revisited in June, cases occurring in small numbers for three to ten weeks. With the exception of 5 cases in Salay, in September and October, this portion of the province has been free from cholera since August. The part of the province including Oroquieta, Misamis, and adjoining towns were not infected until the early part of January, 1903, Oroquieta first and the other towns in quick succession. Here, again, the infection came from Cebu. It was most violent in January and February, and lingered in Oroquieta until May, in Jimenez until June, and in Loculan and Misamis into July. No secondary outbreak has occurred in these towns to the present date.

"Such precautionary measures as were taken seem to have little success in preventing the entrance of the disease or in getting rid of it when introduced.

"*Smallpox*.—Appeared in Talisayan in June, 1903. Death register shows for June to November, inclusive, 271 deaths, and estimated recoveries are about equal. It has now disappeared, except for a few cases lingering in outlying barrios. From this place it spread to Salay in September, in which place there had been 40 deaths to the last of December, with a few cases still existing. From Salay the infection spread to Lagonlong, where the data were not available, and to Balingasag, where, owing to active vaccination, it did not gain a firm hold. Two deaths during December at this place and a few convalescent cases,

but no new cases at the time of visit. San Vicente, a barrio of Oroquieta, was invaded September 6, the infection having come from Bohol, according to local report, and entering Oroquieta proper October 26. Up to the date of my visit, December 10, there had been about 80 cases, with 12 deaths, and 40 cases estimated existing on that date. From this place the disease reached Jimenez, where there were 9 cases, and to Tuleda, a barrio of Loculong (now Misamis), 5 cases at the date of my visit. Loculong proper and Misamis had not yet been infected, though the transfer of a detachment of constabulary from Oroquieta to that place on December 12 renders its introduction there possible. Telegraphic report of the conditions in Oroquieta was made December 14.

"*Animal diseases.*—None was encountered, except 2 sick carabao in Jimenez, believed to be suffering with rinderpest.

"Large herds of cattle and carabao formerly existed in this province, but were almost exterminated by rinderpest in 1902. Observation and inquiry leads me to believe that the number of carabao now in the province does not exceed 500, and cattle are equally scarce.

"HOSPITAL SITES.

"*Cagayan.*—The town will give a site for the erection of a hospital. Of existing buildings, the only ones suitable and of sufficient size are:

"1. The present military hospital, a two-story building of strong materials, with 20 beds. By using the lower floor, at present occupied by commissary and quartermaster stores, for office, pharmacy, etc., this building could be made to contain 35 beds. It is thought that the construction of a post at this place will render this building available within three or four months.

"2. A building belonging to the municipality of Cagayan and at present occupied as barracks by a company of scouts will be available about the same time, and could probably be had rent free for a limited time. Rent of house first mentioned should be about 60 pesos.

"*Surigao.*—The only suitable building in this town is at present occupied as constabulary headquarters, with a rent contract covering 1904. The municipality will give a site. The building mentioned should be rented for 50 pesos per month.

"*Tacloban.*—I was in Tacloban only a few hours and was unable to find a suitable building.

"During the first half year or year of the existence of hospitals in these places the full capacity of 50 beds would probably not be needed and a smaller building could be utilized.

"I would urge that no definite announcement of intention to establish a hospital in any of these places be made until an option is secured on the building selected."

SPECIAL REPORT ON PAMPANGA PROVINCE.

Dr. F. W. Dudley, president of the provincial board of health of Pampanga Province, submits the following report, under date of August 9, 1904:

"The provincial board of health of Pampanga held during the fiscal year ended June 30, 1904, for which period this report is rendered, 21 regular and 14 special meetings, at which, in addition to the ordinary routine business, the following subjects were considered:

"I. Recommended increase of salaries for qualified persons holding positions as presidents of municipal boards of health in cases where their work was satisfactory and the municipal funds would warrant it.

"Upon the presentation of estimates by some of the towns for increase of salaries of presidents of boards of health, the question came up as to whether subsection *g* of section 22 of the municipal code did not apply to presidents of municipal boards of health. This office asked for an opinion, and the attorney-general for the Philippine Islands ruled that the section quoted in the foregoing did not apply, as these officers were not created under the municipal code, but by Act 308, and that, while created for municipal purposes, they are not operated under or subject to municipal control.

"The following increases were made in salaries of presidents of municipal boards of health during the past fiscal year:

Town.	Former salary.	Present salary.	Increase.
SALARIES INCREASED.			
Angeles	₱40.00	₱60.00	₱20.00
Arayat	40.00	60.00	20.00
Bacolor	25.00	66.66	41.66
Candaba	25.00	50.00	25.00
Guagua	40.00	58.33	18.33
Macabebe	33.33	50.00	16.67
Magalang	25.00	40.00	15.00
Porac	30.00	40.00	10.00
San Fernando	50.00	66.66	16.66
SALARIES NOT INCREASED.			
Apalit	20.00	20.00	
Florida Blanca	30.00	30.00	
Lubao	41.66	41.66	
Mexico	33.33	33.33	
Santa Rita	30.00	30.00	
San Luis	30.00	30.00	
Santo Tomás	40.00	40.00	
Total	533.32	716.64	183.32

"Owing to increase in salary it has been possible to secure better qualified persons as presidents of municipal boards of health, as the table below shows:

Qualifications.	June 30, 1903.	Appointed.	Total.	Resigned.	Lost by fusion.	Resignation requested.	Total loss.
Licentiates, medicine	3	3	6		1		1
Cirujanos ministrantes	2	1	3	1			1
Undergraduates	2	5	7		1	1	2
Ex-sanitary inspectors	2		2		1		1
Practical experience	8	1	9	3	2	2	7
Total	17	10	27	4	5	3	12

Remaining June 30, 1904, 15.

"II. The number of towns without presidents of municipal boards of health June 30, 1903, before fusion, when there were twenty-three towns in the province, was six. June 30, 1904, there remained but two towns without presidents of boards of health, and in one of these, Mexico, a licentiate of medicine will be shortly secured to fill the vacancy, and in the other, Mabalacat, a provisional board of health has been organized, with the municipal president as acting president.

"Five municipal boards of health and one provisional board were organized during the year. Licentiates of medicine holding such appointments were increased from 3 to 5, undergraduates by 3, and 'persons of practical experience only' were reduced from 8 to 2.

"There were twenty-four towns in the province on June 30, 1903, but owing to fusion of towns there remained but seventeen on June 30, 1904. The attorney-general rendered a decision to the effect that when two towns were fused, both having presidents of boards of health, both positions became vacant. Owing to the fusion 5 presidents of municipal boards of health lost their positions. Three of these were reappointed, the remaining 2 not being qualified for appointment under the existing law.

"III. It was recommended that artesian wells be bored in certain towns situated upon the estuaries of Manila Bay, where it is impossible for people to obtain potable water without going a great distance. The result is that the poor people are obliged to drink the impure water at hand.

"IV. A resolution was passed June 5, 1903, requesting the Manila Railway Company (Limited) to repair and maintain in a sanitary condition all water-closets located at stations on their line in this province. On January 30, 1904, no notice having been taken by the company, a copy of the resolution was mailed to the commissioner of public health with a statement of the facts in the case. Up to the present writing no improvements have been made by the company. All the closets of the company in this province are in a filthy and dilapidated condition.

"V. A resolution was passed June 24, 1904, recommending for adoption by all towns in the province of Pampanga a sanitary ordinance prepared by the president of the provincial board of health. The object of this ordinance was not to take the place of local legislation, but rather to serve as a guide to secure, when existing conditions permitted, uniform legislation throughout the province in sanitary matters. The ordinance was approved by the members of the provincial board individually before being sent to the presidents of municipal boards of health. The ordinance has been adopted by nine towns, and in three of these slight modifications have been made by the local governments. The remaining eight towns have not yet been heard from, but will most likely adopt it. A copy of this ordinance, in Spanish, is attached hereto, a translation into English not having been made.

"VI. It was recommended that the different pueblos purchase the necessary carts and carabaos and employ a sufficient number of men for the policing of same. Most of the towns are now so equipped and the results are gratifying.

"VII. A recommendation was made that each town purchase the necessary medicines for treatment of the sick poor and that the president of the municipal board of health hold a clinic for that purpose.

"Following is a list of the amounts expended by each town for medicines and surgical dressings for the poor, and disinfectants, during the year ended June 30, 1904:

Town.	Amount.	Town.	Amount.
Angeles	₱135.00	Magalang	₱20.00
Apalit	30.00	Mexico	55.00
Arayat	50.00	Porac	50.00
Bacolor	180.00	San Fernando	40.00
Candaba	50.00	San Luis	40.00
Florida Blanca	0.00	Santa Rita	30.00
Guagua	105.00	Santo Tomás	100.00
Lubao	75.00		
Mabalacat	0.00	Total	1,020.00
Macabebe	60.00		

"The above-noted expenses include disinfecting pumps for towns which have requisitioned for same.

"The following disinfectants were issued by the provincial government to the different towns in the province requiring them during the fiscal year ended June 30, 1904: Carbolic acid, 100 liters; mercuric chloride, 1.103 kilograms; chloride of lime, 10 kilograms.

"VIII. Fourteen of the seventeen towns in the province, on the recommendation of this board, have put in estimates for money for the purchase of disinfecting pumps for use in case of the appearance of contagious disease. The estimates have been approved and the pumps will be purchased for the towns by the provincial supervisor, who will also buy a lot of medicines and disinfectants for towns which have recently requisitioned for the same.

"IX. On March 26, 1903, this board sent out a circular letter to all presidents of municipal boards of health requesting that they see that Act 597, regulating the practice of pharmacy, be strictly complied with, and if upon inspection it was found that the act was being violated that evidence be secured and the provincial board of health be notified. All the drug stores and tiendas selling medicine were inspected by the president of the provincial board of health, and as a result of the investigation nine were found to be running without a licensed person in attendance. In some of these stores certificates of registered persons were displayed, but the persons to whom the certificates were issued were not present, but were exercising their profession in Manila or elsewhere.

"It was quite clearly demonstrated that these certificates were, in most instances, rented to the owners of the drug stores in which they were found for a monthly fee and in others for an interest in the business.

"Three of these nine pharmacies secured licensed dispensers, the remaining six being closed. Two persisted in conducting their business contrary to Act 597 after repeated warning, so charges were placed against them and their cases are now in the hands of the provincial fiscal.

"X. Circular letter No. 5, dated November 11, 1903, was sent out to all presidents of the municipal boards of health, requesting a strict enforcement of Act 310, regulating the practice of medicine.

"There are great numbers of persons practicing medicine in the province under various titles, such as herbolarios, practicantes, curanderos, etc. Their knowledge of medicine is, as a rule, very crude, and of surgery they know absolutely nothing, yet they do not fear to assume the responsibility of the most severe case of either without consultation. Many of them work under direction of licentiates of medicine, who protect them. It is very difficult to secure sufficient evidence to obtain a conviction, as the people whom they treat (the vast majority of the population) will not aid in their prosecution, and the question of whether or not they receive fees for their services is an open one.

"With one exception the president of the provincial board of health has received no assistance from the medical profession in the prosecution of this class of practitioners, and this exception can hardly be noted as such, as the person referred to was an undergraduate of medicine.

"The practicante and his class will most likely exist until the mass of the people become sufficiently educated to enable them to distinguish between an educated and an uneducated physician.

"Charges have been preferred against three of the foregoing class of practitioners and their cases are now in the hands of the provincial fiscal.

"XI. On the recommendation of this board a hospital of bamboo and nipa has been erected in the provincial jail for the treatment of prisoners. It consists of a dispensary, operating room, and a ward with a capacity of eight beds. The hospital is sufficiently supplied with medicines and equipped with instruments to treat ordinary cases.

"XII. The general sanitary condition of towns, and market places therein, has been greatly improved during the past year, but much remains to be done in the way of the construction of proper buildings, which the municipalities are too poor to undertake at the present time.

"XIII. It was recommended that the town of Arayat construct a pipe line from the base of Mount Arayat into the pueblo for the purpose of supplying the municipality with water for drinking and other purposes. There is a flowing spring at the foot of the mountain capable of supplying a town much larger than Arayat and the elevation is sufficient to carry the water much higher than any house in the pueblo. Some power could also be secured from a stream which finds its source in numerous springs on the mountain. The distance from the spring to the town is about 1 mile. The water is excellent. Lack of funds prevents any action being taken in the matter at present.

"XIV. The provincial board of health of Pampanga desires that one of the proposed provincial hospitals be located at San Fernando, owing to its central location, and believes that such a hospital located at San Fernando would prove serviceable to Bataan, Bulacan, Tarlac, Pangasinan, and Nueva Ecija provinces, for reasons stated to the civil commission by the citizens of this province, in a petition to that body requesting the location of one of the provincial hospitals in Pampanga. A copy of this document was furnished the commissioner of public health for his information.

"Buildings can be secured which will serve well for all temporary needs.

"Many poor people die annually for the want of medical and surgical treatment, as it is impossible to render such in their homes. A hospital of 25 beds could be filled at once with surgical cases amenable to treatment from Pampanga Province alone.

"XV. Two autopsies were performed during the year by presidents of municipal boards of health and two by the president of the provincial board of health.

"On the recommendation of the president of the provincial board of health a complete set of autopsy instruments has been ordered by the provincial board.

"XVI. Actual and necessary expenses for carromata and banca hire, etc., are allowed presidents of municipal boards of health by the provincial treasurer, when traveling on official business in barrios of their respective towns and on official trips to the provincial capital. This small but necessary expenditure has increased the efficiency of the service very much.

"XVII. The last case of cholera occurred in the town of Porac on January 26, 1904. It will be remembered that the first case of cholera appeared in Pampanga, in the town of San Simon, on April 6, 1902. The total cases and deaths reported for the epidemic were as follows:

Period.	Cases.	Deaths.	Mortality.
April 6, 1902, to June 30, 1903	4,107	2,811	68.44
June 30, 1903, to June 30, 1904	550	434	81.88
Total	4,657	3,245	69.68

"XVIII. The following figures show the extent of smallpox in the province:

Period.	Cases.	Deaths.	Mortality.
October 1, 1902, to June 30, 1903	Not known.	228	Not known.
June 30, 1903, to June 30, 1904	739	336	45.45
Total		564	

"Smallpox was epidemic in Santo Tomás and Minalin, a barrio of Santo Tomás, during the months of October, November, and December, 1903, and January, February, March, April, and May, 1904. There were 198 deaths in this town from the disease. Until recently Minalin and Santo Tomás were separate pueblos and neither had a board of health, being too poor to pay presidents of such boards. They were fused into one town, with the municipal government at Santo Tomás, in January, 1904. A president was appointed and he reported for duty in Santo Tomás, March 11, 1904, organized a health board and began vaccinating. Two public vaccinators were ordered there to assist and reported for duty March 12, 1904.

"Owing to the fact that very little vaccination had ever been done in this district the people in the barrios about Minalin, where the disease was most severe, objected to vaccination. Although the vaccinators were accompanied by policemen and often by the municipal secretary, who tried to explain to them the necessity for vaccination, women would take their children and flee to the fields, often jumping from the windows of their houses if taken by surprise. By the end of June, 1904, the disease had disappeared.

Record of vaccination from October 1, 1902, to June 30, 1903.

By whom vaccinated.	Positive.	Negative.	Total.	Per cent positive.
Presidents of municipal boards of health	10,403	6,971	17,374	59.87
Provincial public vaccinators	7,647	1,184	8,831	86.36
Total	18,050	8,155	26,205	68.88

Vaccine virus received and issued from October 1, 1902, to June 30, 1903.

	Units.
Received from laboratory, Manila	29,900
Issued to presidents of municipal boards of health	18,600
Issued to provincial public vaccinators	10,500
Issued to private vaccinators	300
Broken in transit	500
Total	29,900

Record of vaccination from June 30, 1903, to June 30, 1904.

By whom vaccinated.	Positive.	Negative.	Total.	Per cent positive.
Presidents of municipal boards of health	16,617	10,275	26,892	61.75
Insular public vaccinators	6,215	13,738	19,953	31.14
Total	22,832	24,013	46,845	48.73

Vaccine virus received and issued from June 30, 1903, to June 30, 1904.

	Units.
Received from laboratory, Manila	53,700
Issued to presidents of municipal boards of health	29,100
Issued to insular public vaccinators	21,700
Issued to private vaccinators	200
Broken in transit	200
On hand	2,500
Total	53,700

Record of vaccination by provincial board of health since its organization.

Period.	Positive.	Negative.	Total.	Per cent positive.
October 1, 1902, to June 30, 1903	18,050	8,155	26,205	68.88
June 30, 1903, to June 30, 1904	22,832	24,013	46,845	48.73
Total	40,882	32,168	73,050	55.96

Vaccine virus received and issued since organization of board.

Received.	Units.
Fiscal year ended June 30, 1903	29,900
Fiscal year ended June 30, 1904	53,700
Total virus received	83,600

	Units.
Issued:	
Fiscal year ended June 30, 1903	29,400
Fiscal year ended June 30, 1904	51,000
Total virus issued	80,400
Broken:	
Fiscal year ended June 30, 1903	500
Fiscal year ended June 30, 1904	200
Remaining on hand June 30, 1904	2,500
Total	83,600

"The entire work done by provincial public vaccinators (two men) from October 1, 1902, to June 30, 1903, amounted to 271 working days for one man. There were vaccinated by these public vaccinators 8,831 persons, or an average of 33.07 per man per day for each day actually employed, with a positive percentage of 86.50.

"The entire work performed by insular public vaccinators (four men) from January 11 to June 27, 1904, amounted to 676 working days for one man. There were vaccinated by these public vaccinators 19,953 persons, or an average of 29.51 per man per day for each day actually employed, with a positive percentage of 31.14.

"Smallpox appeared in Bacolor on February 1, 1904, and the last case was noted on May 9, 1904. There were but 35 cases and 7 deaths. Fearing an epidemic two provincial sanitary inspectors were temporarily employed. These two men were engaged in vaccinating from March 31 to April 5, 1904, making the entire work performed amount to seventy-two days for one man. There were vaccinated by these provincial inspectors 3,078 persons, or an average of 42.75 per man per day for each day actually employed, with a positive percentage of 82.09. As these two men worked under direction of the president of the municipal board of health of Bacolor and were employed as emergency provincial sanitary inspectors, the results of their labors were included under "Vaccinated by presidents of municipal boards of health" in the foregoing annual statistics.

"It will be noted in the foregoing that, in both instances, provincial vaccinators vaccinated more persons than insular vaccinators, with over double the per cent of positives. In this connection attention is invited to the positive results obtained by presidents of municipal boards of health.

"The reason the insular vaccinators vaccinated fewer persons was because they were not of this province and were unable to speak the local dialect. They were, therefore, unable to explain their work to the people and lost much time in gaining their confidence. The low percentage of positives is attributed to careless inspection.

"Of the four insular vaccinators working in this province during the latter half of the fiscal year just passed, not one of them was able to properly render their accounts for salary and traveling expenses, thus putting considerable extra work on this office, which is inadequately supplied with clerical assistance.

LEPROSY.

	Cases.
Reported immediately after organization of the provincial board of health	13
Reported during the fiscal year ended June 30, 1903	3
Reported during fiscal year ended June 30, 1904	7
Total cases reported since organization of board	23
Deaths reported during year ended June 30, 1904	5
Cases remaining June 30, 1904	18

"The majority of towns in the province having leprosy cases desire that they be isolated in a government institution, and eagerly await the completion of the proposed leper colony.

"INSANE.

"There were on June 30, 1904, 66 insane persons in the province, classified as follows:

Classification.	Males.	Females.
Widows		4
Males, married	7	
Females, married		12
Males, single	24	
Females, single		19
Total	31	35

"Of these, 3 are violent and 63 are not violent. All are cared for by relatives, none being charges upon the municipalities. There are 36 without financial resources sufficient for support and 30 with sufficient financial resources for maintenance.

"BIRTHS AND DEATHS.

"The following comparative table of births and deaths is for the fiscal years ended June 30, 1903, and June 30, 1904, respectively. The provincial board of health having been organized on October 1, 1902, there are no data for the months of July, August, and September, fiscal year ended June 30, 1903:

BIRTHS.

Month.	Births.	Annual birth rate per 1,000 per month.	Month.	Births.	Annual birth rate per 1,000 per month.
1902.			1903.		
July			July	1,137	60.32
August			August	1,018	54.01
September			September	902	47.85
October	690	38.26	October	857	44.63
November	697	38.88	November	890	47.90
December	690	38.26	December	998	51.98
1903.			1904.		
January	826	46.00	January	1,044	54.38
February	697	38.82	February	995	55.40
March	708	39.43	March	981	51.10
April	834	44.24	April	943	50.75
May	1,106	58.66	May	1,000	52.09
June	1,089	57.76	June	822	44.24
Total	7,337	44.48	Total	11,587	51.20

DEATHS.

Month.	Deaths.	Annual death rate per 1,000 per month.	Month.	Deaths.	Annual death rate per 1,000 per month.
1902.			1903.		
July			July	772	40.95
August			August	585	31.03
September			September	547	29.02
October	522	28.94	October	627	32.66
November	739	40.99	November	851	46.24
December	975	54.08	December	723	37.66
1903.			1904.		
January	857	47.54	January	615	31.51
February	711	39.43	February	508	28.28
March	631	35.00	March	554	28.85
April	667	35.38	April	589	31.70
May	895	47.47	May	622	33.30
June	774	41.23	June	640	34.44
Total	6,771	41.12	Total	7,633	33.81

Principal causes of deaths in Pampanga Province for the fiscal year ended June 30, 1904.

Cause.	Total deaths	Cause.	Total deaths.
Convulsions of children	2,026	Malarial cachexia	101
Intermittent fever and malarial cachexia	1,131	Simple meningitis	86
Tuberculosis of lungs	799	Acute bronchitis	77
Variola	336	Chronic bronchitis	82
Senile debility	492	Recurrent fever	72
Dysentery	236		
Typhoid fever	168	Total classified diseases	6,970
Diarrhea and enteritis	136	Other causes	1,565
Eclampsia nonpuerperal	128		
Other special diseases of early infancy	107	Total	7,635
Unspecified or ill-defined causes of deaths	103		

"DISEASES OF ANIMALS AND POULTRY FOR THE FISCAL YEAR ENDED JUNE 30, 1904.

"Carabaos to the extent of 590 were reported as having died from rinderpest and 7 cattle from the same disease. Six carabaos died from foot-and-mouth disease. Twenty-three horses died from glanders and 4 from surra. There were 2,377 deaths among swine; the diagnosis is not known, but was most likely hog cholera. There were recorded 5,546 deaths under the heading of poultry; diagnosis of cases were not made, but it is thought the disease was, in the vast majority of cases, hemorrhagic septicaemia. With few exceptions cases recorded under poultry were chickens.

"XIX. This board requested of the commissioner of public health by telegraph on March 14, 1904, and again on June 17, 1904, that a veterinarian be sent to this province for the purpose of inoculating carabaos against rinderpest, and the promise was made that the request would be granted as soon as men were available.

'All the towns in the province are anxious to have their carabaos immunized, save Macabebe, Apalit, and San Luis. These towns are in easy communication with Calumpit, Bulacan, where a party of inoculators was recently at work, and rumor has it, in the towns mentioned, that about 7 per cent of the carabaos had died as a result of the inoculation.

"It is estimated that 4,000 carabaos will be presented for immunization, and when the results obtained by the present method are observed that the people of Macabebe, Apalit, and San Luis will offer their carabaos for inoculation also.

"The general health conditions of the province are much better than at any time since the organization of the present board of health, October 1, 1902.

"NOTE.—Deaths among swine and poultry are from January 1, 1904, to June 30, 1904, only, the other reports on animals covering the entire fiscal year, June 30, 1903, to June 30, 1904."

REPORT OF SPECIAL SANITARY INSPECTION IN THE PROVINCES OF PAMPANGA, TARLAC, PANGASINAN, BENGUET, AND UNION.

Dr. M. C. Terry, medical inspector, under date of February 8, 1904, makes the following report of inspection in the provinces of Pampanga, Tarlac, Pangasinan, Benguet and Union:

"PAMPANGA.

"The following towns were visited: San Fernando, Bacolor, Guagua, Betis (now annexed to Guagua), Santa Rita, Porak, Mexico, Arayat, Santa Ana (now annexed to Arayat), Angeles and Magalang.

"A board of health, properly constituted, exists in each of these places. The present sanitary condition of the following towns, in view of the existing circumstances, may be said to be satisfactory: Porak, Angeles, Santa Rita, San Fernando, and Magalang.

"None of the towns visited in this province is extremely dirty, and in general, the work of the board of health is as well performed and accomplishes as much good as one should expect, taking into account the short time these local boards have been in existence and the prevailing ignorance, opposition and unchangeable habits of the majority of the inhabitants. Of all the towns mentioned, Porak and Angeles make the best appearance.

"Betis has a neglected look. The condition of the public well is a source of danger. It is an artesian well, 22 meters deep, sunk in 1894 at a cost of $800 Mexican currency. A small expenditure would insure the town a good supply of safe water and would probably lessen the number of cases of diarrhea and dysentery.

"Guagua is in only fair condition. A street-cleaning gang is one of the greatest needs. Two carts, well managed, would be enough for both Betis and Guagua. These carts should be under the control of the board of health and not of the municipal president.

"In Santa Rita some very good work has been done in filling and grading the yards and streets. Sand and gravel are used for the purpose. A large pool of water at the right on entering the town should be filled.

"In Bacolor there has been strife between the president of the municipal board of health and the municipal president, a rather common finding, and the result is seen in dirty yards, neglected streets and wandering hogs, a condition of things highly discreditable to a provincial capital. The president of the municipal board of health was unable to do much against the opposition of high authority. I understand that he has since been replaced by another man. The local ordinances are sufficient for the improvements the town needs.

"In Mexico the rubbish from streets and yards is thrown into the river or beside the bridge. Otherwise the town is in fair condition.

"Santa Ana is in fair condition although it has had no health board. In general the people clean up their premises fairly well.

"From what I have heard of Arayat since my visit there, I think Idid not see the best part of the town. What I did see was unkempt and forlorn. A long, deep ditch at the side of

the road would be useful if kept open. Divided as it is, into many pools of standing water, within a few yards of the houses, it is undoubtedly a source of malaria.

"PROVINCE OF PAMPANGA.

"In 23 towns of this province, having a population of 226,180, there were 1,905 deaths, a mortality of 33.43 per 1,000, for the three months ending September 30, 1903. The principal causes of death (excepting cholera) were: Convulsions of children, malarial fever, tuberculosis of lungs, senile debility, and dysentery.

"*Cholera.*—The following shows the record of cholera in seventeen towns of the province for the period July 1, 1903, to November 29, 1903, inclusive:

Month.	Cases.	Deaths.	Mortality.
July	110	80	72.72
August	10	9	90.00
September	28	26	92.86
October	50	44	64.60
November	226	146	64.60
Total	424	305	76.96

"It will be observed that in the foregoing table a noticeable increase of cases and deaths is shown for the month of November. Investigation demonstrated the fact that this increase was due principally to the celebrations held once a year in the towns of the province. Up to the 15th of November cholera existed in but five towns of the province. Between this date, which coincided with the annual festivities in Bacolor, and November 26 new cases gradually appeared in ten more towns, and in Bacolor the number of cases and deaths also increased.

"There are seventeen towns having organized boards of health in this province."

Doctor Terry states he has several times heard of calut, a tuber of some sort growing in the mountains, which the poor people eat in times of rice famine. If soaked and cooked for several days it is said to be wholesome, but if improperly prepared it is poisonous and often proves fatal, the patient dying with many of the symptoms of cholera, although the description of its effects do not always agree.

PROVINCE OF TARLAC.

Doctor Terry reports that he inspected all municipalities in this province except Bamban, and all barrios of importance except the following: Marcia, Anao, San Clemente, Variones, and O'Donnell.

"Capas was the first municipality visited. This place has a population of 3,809, disposed, for the most part, along one large street. Owing to fear of ladrones, not only the hogs but also the carabao are kept under the houses. Consequently the sanitary condition of the place is bad, and there is no apparent way of improving it. At the date of my inspection, December 7, no entries had been made in the death register.

"Nothing could be seen at Concepcion to indicate the existence of a board of health. The streets were littered with rubbish and most of the yards were filthy. There was a dumping ground for rubbish almost under the windows of the presidente's house. The presidente de sanidad blamed the ex-presidente municipal; the presidente municipal blamed the ignorance of the people and the lack of funds, and all agreed in blaming Felipe Salvador, the outlaw. There was reason in all their excuses, but that they did not constitute the whole explanation was shown by the fact that the appearance of the town greatly improved while I was there. Doctor Catanjal agreed with me that it would be well to look for another man for presidente de sanidad, and later on Doctor Abad was transferred there from Pura.

"Tarlac has been much neglected by its local health officer and is in need of vigorous treatment. It has the advantage over most towns in the province of having two street-cleaning carts, which cost $1 Mexican per day each, but the cleaning is not supervised and is poorly done. In the rainy season, when the river rises, a considerable part of this town is inundated.

"La Paz is distant some three hours, horseback, from Tarlac, by a road practically impassable in the rainy season. With the exception of some good houses recently built, the whole place looks very miserable. Perhaps the people could be taught to raise the ground under their houses a little above the surrounding level and so avoid so much standing water and so many hog wallows immediately under their habitations, but it is hard to see what more could be done for them at present. The presidente de sanidad of La Paz received 15 pesos per month when the town was able to pay it. The month before I was there he had to be content

with 7½ pesos. The town of La Paz has a population of 4,148. It is now reduced to a barrio and made a part of the town of Tarlac.

"Victoria seems pretty well looked after. The market was especially clean and well regulated the day of my inspection. Both the presidente de sanidad and the presidente municipal have done good work for the board of health.

"Gerona has suffered from discord between the board of health and the presidente. The presidente has been molested, but he hopes to be able to pay more attention to the sanitation of his town in the future. The place made a good appearance the day of my visit. It employs no cleaning carts.

"Paniqui was in good condition. General cleanliness was as evident as in Victoria. Many of the premises are provided with excavations for water-closets properly penned against the entrance of animals. This is very exceptional, as the 'hog system,' as it may be called to avoid a more detailed description, is almost universal in the provinces inspected.

"Moncada, the next town above Paniqui, does not make as good a showing from a sanitary point of view as Gerona and Paniqui. The following from the record of the board meetings illustrates a common weakness:

"May 13 a session is called and a resolution passed calling on the presidente to urge a strict observance of the town's sanitary ordinances. July 3 a special meeting is called to inform the presidente that a case of cholera has appeared and to recommend to him the observance of sanitary rules. July 5 the board meets again, declares the presence of cholera, and calls on the presidente to buy medicines, etc. Similar instances can be found almost everywhere. The president of the board of health feels that he has no power whatever, or if he thinks he has he is in almost all cases afraid to exercise it. Having called the presidente's attention, officially, to anything from the presence of cholera to the bad state of a water-closet, he feels that he has done his whole duty and the responsibility rests thereafter upon the presidente. Too often the presidente, it is true, opposes and makes of no effect the well-directed or well-meant efforts of the board of health. But, on the other hand, one does not often find a health officer who understands his powers and has the courage to exercise them. This is partly due to the fact that his salary, within the limits prescribed by law, is determined by the town council. It is clearly not to his interest to create a 'disgusto' between himself and the presidente.

"Camiling, exclusive of two barrios which have recently been added to it, is the largest town in the province. In general, and within the limitations already referred to, its sanitary condition is fair. In a barrio called Pao, fifteen minutes' walk from the presidencia, 9 cases of smallpox were discovered in the course of a brief inspection. The disease had been prevalent in that barrio and no action had been taken up to that time by either the local or the provincial health board. In the town at large, not counting San Clemente nor Santa Ignacia, there were 11 deaths from smallpox in September, 12 in October, 19 in November, and 19 in December up to the date of inspection, December 17. Two of the children in the barrio referred to, Pao, died that night, making a total of 21 for the month up to December 17, 1903.

"CHOLERA IN TARLAC IN 1903.

"*Its introduction into the province.*—From the beginning of 1903 to the 1st of July last the entire province of Tarlac was free from cholera. In the month of July certain persons proceeding from Dagupan, Bautista, and Bayombong introduced cholera into the town of Moncada, and in this municipality occurred the first case of cholera in the province of Tarlac in 1903. From Moncada the disease was carried to Paniqui, where, on the afternoon of the 4th of July, Father Victorio Najere died in the barrio of Bané.

"The first case of cholera in the city of Tarlac and in the town of Bamban also came from the province of Pangasinan. In Victoria and Anao the cholera was introduced from the neighboring towns in the province of Nueva Ecija. The first persons attacked in Camiling came from Pangasinan. In October cholera reappeared in Tarlac. Certain of the persons attacked came from other towns. In November several cases occurred in Murcia, the persons attacked coming from the festivities at Bacolor, Pampanga.

"*Measures adopted.*—In Moncada, Paniqui, and the remaining towns of the province the orders of the provincial board of health in matters of sanitation were carried out by the municipal presidents of health. All houses and all residents of houses in which cholera occurred were subjected to a five days' quarantine. Disinfectants were generously supplied to all towns in need of same. The municipal councils appropriated funds for the purchase of medicines for the indigent sick. Municipal sanitary inspectors were appointed, the consumption of certain foods prohibited, and the use of water not previously boiled forbidden. Special cemeteries for those dying of cholera were established. Sanitary instructions in simple language within the comprehension of all were distributed to the municipalities and their translation into the current dialects was ordered. In a word, the sanitary regulations adopted by the board of health in 1902 were again put into effect, with the single exception of quarantine of the province.

Number of cases of cholera and date of last case in each municipality from June 30, 1903, to December 12, 1903.

Town.	Total number of cases with deaths.	Date of last case.	Town.	Total number of cases with deaths.	Date of last case.
Tarlac	26	Nov. 28	Anao	24	Sept. 17
Murcia	5	Nov. 25	Gerona	7	Nov. 6
Capas	7	July 31	Paniqui	268	Nov. 2
Bamban	3	July 31	Moncada	147	Sept. 7
Concepcion	14	Oct. 30	Camiling	66	Aug. 17
La Paz	8	Oct. 18	Santa Ignacia	1	Aug. 6
Victoria	120	Nov. 8			
Pura	20	Oct. 20	Total	716	

"PROVINCE OF PANGASINAN.

"Bautista has a presidente de sanidad, but no board. The school-teacher member was transferred some time ago, and his successor has not been installed in his place on the board by the division superintendent of education. No member has been selected by the council. There are no minutes of meetings in the year 1902. The town needs a better market place. Stagnant pools at the side of the railroad station on railroad property should be filled up. I was told that smallpox existed in some distant barrios, but I found none in the town proper. The register showed no deaths from smallpox since November 11, 1903.

"Bayambang is an average town in the matter of cleanliness. It is separated from Bautista only by the river.

"Alcala was the next town inspected after Bautista. In the year just ended the first case of cholera appeared July 19, 1903. The last case was on August 23, 1903. Total cases, 276; total deaths, 156. The greatest number of deaths in one day, due to cholera, was 13, on August 5. Only two sessions of the board were held in 1903, one in January and the other in May. From July 8 to September 27 there were 35 cases of smallpox, and 26 deaths. There had been no service of garbage carts for about a month, owing to lack of funds. Before that time the town employed one cart at 20 pesos per month. It is a straggling village, fairly clean.

"Villasis is neither better nor worse than the average. The first death from cholera was noted July 24, 1903, and there were 91 deaths from the disease that month. September 11 the epidemic was at an end, with a total of 385 deaths. One case occurred later, October 23. Smallpox cases occurred in every month from July on. They increased in September. There were 64 deaths from smallpox in a total of 107 cases that month; about the same number in October; 35 in November; 34 in December up to December 28. Practically all cases were in small children under 5 or 6 years.

"Vaccinations began March 6, 1903. The presidente de sanidad vaccinated 447 persons, the greater number over 15 years of age. Every one of the 447 had been previously vaccinated from one to eight times. Of the 447, all but 80 have had smallpox in the past, if the record can be believed.

"The attention of vaccinators going to the provinces should be called to the importance of vaccinating children under 5 years of age.

"Rosales stands in need of general cleaning. The health officer knew of no cases of smallpox in town, but in the course of our inspection we discovered 3 or 4 cases in the pustulous stage, and as many in the stage of desquamation, all in children under 5 or 6 years of age. Cholera appeared July 27, 1903, increased rapidly in August, and disappeared August 26. This town charges $1.50 for each interment; if a coffin is used a second interment can be made in the same place within two years. Only three meetings of this board have been held since its organization in April, 1902.

"Umingen has no board of health, and is not financially able to support one. The town is favorably located as to soil and drainage, and its sanitary condition is as good as the average. The marriage record has no entries for 1903. The secretary does not know why.

"San Quintin is quite clean. Cholera appeared here on August 20, 1903. Vigorous measures to stamp it out were at once employed by the presidente de sanidad, and resulted in the disappearance of the disease August 31, after a mortality of only 13. San Quintin has had smallpox cases every month since August. November showed 30 deaths from that source out of a total of 49; September up to December 27, 24 out of a total of 44. The first case of smallpox was reported April 30. They repeatedly asked for vaccine lymph from the provincial board without getting it. The town was inspected by a deputy sent by the provincial board of health in January, 1903. A sanitary assistant inspector

is employed at 12 pesos local currency per month. Up to August 1 a garbage cart was employed at 2 pesetas per day.

"Natividad no longer exists as a separate town, and has no board of health. It is situated on a gentle slope near the mountains, and the natural drainage of the place is excellent. It has a neat, trim appearance, due to the regular manner in which it is laid out. It was touched by cholera in 1903, the disease appearing July 23, and disappearing August 7, having caused 15 deaths. The first death from smallpox was recorded May 7, 1902. There was an average of 13 deaths a month from that disease in September, October, and November. In December, up to the 28th, it was the cause of 22 deaths out of a total of 34. I found 4 cases while I was there.

"Tayag presents nothing out of the ordinary. Cholera ended here with a case reported September 6, 1903, which was recorded. The first case was imported from the town of Calasiao, where a fiesta was held August 18, 1903. There were 16 deaths from the disease.

"San Nicolas is up to the average in the matter of hygiene and sanitation. No deaths from cholera are recorded in 1903, but there was a suspiciously large number of deaths from diarrhea. The register is made up from data furnished entirely by the cura. No entries had been made for December, and I was there January 1, 1904, and the president of the board of health had no record of any deaths that month.

"Santa Maria is now a barrio of Tayag. It had its first case of cholera July 29, 1903. There were 7 cases and deaths that month, and 65 in August; last case August 22. About 180 children were vaccinated in 1902; none in 1903. The first case of smallpox occurred January 8, 1903. There were no more cases that month, but there were 18 in July and 22 in August.

"Asingan does not make a good showing, for its health officer has evidently been very careless. The death record is poorly kept. Whole pages are blank in the column for diagnosis. Cholera appeared July 11, 1903, in the person of a Chino who came from Bautista. The last case was recorded September 6, 1903. Only a guess could be made as to the total number of deaths from this cause, but it was undoubtedly enormous. Out of 158 deaths from smallpox, September to December, only two were over 6 years old, one 7 years, and one 8 years old. The record is kept by the cura, who furnishes the notes to the municipal secretary. The relatives sometimes inform the secretary or the health officer. No vaccinations were done in 1903.

"San Manuel, now a barrio of Asingan, was not inspected. Its former presidente de sanidad came to see me at Asingan, and from questioning him I determined that the condition of the place did not differ materially from towns already inspected.

"Binalonin is rather above the average in cleanliness of houses and yards. Beriberi is a more common diagnosis here than in other towns so far as I have gone. The first case of cholera was noted July 7, 1903. There were 118 deaths that month, 151 in August, and 1 in September. The last case was September 6, 1903. All data furnished by the padre. Of all the smallpox cases, October to December, only 3 were over 5 years of age.

"Pozorubio is decidedly dirtier than most towns, except around the plaza. The market place is cumbered with the accumulated trash and manure of weeks, in which a policeman and an 'encargado de limpieza' wander aimlessly about. The town employs no garbage carts, but has a sanitary inspector to assist the board of health, and a man charged with the regulation of the market, at 8 and 7 pesos local currency per month, respectively.

"An ordinance requires smallpox and cholera dead to be taken directly from the house to the graveyard. There is no reason to suppose it is enforced. There were deaths from smallpox in every month of the year except February and March.

"Cholera began July 21, 1903, and lasted until September 23, 1903, with deaths as follows: July, 3; August, 151, and September, 28.

"Monaog is in fair condition. In the last three months of 1902, and the first three months of 1903, some 700 vaccinations were done here, almost all of them in children under 5 years, and about 90 per cent of them successful. The value of that work is seen in comparing the smallpox deaths of the town with those of the neighboring towns, Asingan, Binalonin, and Pozorubio, where, as far as can be determined from imperfect records, vaccination was not so well carried out. In the months of September, October, November, and December, 1903, Manaog, with a population of 19,763, had only 7 deaths from that disease; Asingan in the same months, with a population of 12,901, had 148; Binalonin, population 14,615, had 125; Pozorubio, population 12,811, had 46.

"Cholera began July 24, 1903, and ended September 10, 1903, with a total of 307 deaths. The town hires one cart at 20 pesos local currency per month, and a sanitary inspector at 15.

"Urdaneta does not give much attention to sanitary matters. Cholera began June 23, 1903, and killed, all told, 752 persons. The epidemic practically ended in August, though there were 7 deaths from it in September, 1 in October, and 1, the last, November 14, 1903. Smallpox was present during the spring and summer; 16 died of it in July. The total number of deaths that month was 567, according to the official death record.

"There are glaring discrepancies between the death record kept by the town and the parish register. The former in the month of November shows 28 deaths, the latter 32. The former on the day of my inspection, January 6, 1904, had no entries for December.

"Vaccination seems to have been well carried on here, some 500 having been vaccinated during 1903. About 300 of them were children under 5 years of age. The result, however, is recorded in the first 200 only.

"Santa Barbara, aside from a beautiful convent and a very few good houses, is a string of ordinary nipa shacks. There is said to be some smallpox there, but not much. Santa Barbara is now incorporated with Calasiao.

"Calasiao is a clean looking town, and is, I believe, well looked after by its presidente de sanidad, who has had some experience on the board of health in Manila, and shows the result of that training. The town should have a new market place, as the old one is in a ruined state. It needs one or two garbage carts. January 17, 1903, the first case of smallpox was discovered. It was a mild case, followed by recovery, but the house was disinfected and the contacts vaccinated. Cholera was prevalent from the middle of June to the last of September, 1903, causing 689 deaths.

"Malasiqui does not call for special comment except as to its drainage. It has some good ditches, but they are so cumbered with banana stalks and other rubbish, and are so frequently stopped by little dams placed to catch fish, that they are practically useless. Furthermore, they are not always connected from block to block. The diagnoses in the death register are made by the padre.

"The last case of smallpox here occurred April 7, 1903. In 1901 the military government vaccinated everything over 1 month old.

"The first case of cholera was recorded July 14, 1903, after two weeks of 'acute enteritis,' etc., as I have observed in several other towns. The last case was September 4, 1903; total invasions, 651; deaths, 567—all natives. None of the town officials, when I was there, had received any pay since May, as all funds were spent in the cholera epidemic of 1902 and 1903.

"San Carlos was inspected January 8, 1903. Luis Revilla is the presidente de sanidad interino. He relieved the regularly appointed man, Eustasio del Rosario, August 7, 1903, and for some reason, which was not made clear to me, has continued interino ever since, while the other man is secretary in a college in Dagupan. About the same sanitary conditions exist here as elsewhere. The records are not well kept. No fines have been imposed in sanitary cases since May, 1902.

"The town hires two street carts at 20 pesos local currency per month each. August 4, 1903, 26 deaths from diarrhea are recorded. August 11, 1903, the first diagnosis of cholera was made. The epidemic lasted until October 5, 1903, causing a total of 384 deaths, almost all of which were in August. There was a death from smallpox July 4, 1903, and, according to the record, none since.

"Dagupan could not well be dirtier than it is, but at the same time, considering the location and the character of the population, it is difficult to see how it could be much improved, except at great expense. The town hires two carts and a sanitary inspector.

"Smallpox has been rife in the barrio of Buncan, across the river, but is declining there. It is increasing slightly in the town proper.

"Binanley and Lingayen are both very neat and clean, compared with the majority of the towns.

"Magdalena also is better than the average. Smallpox has been present every month of the year 1903 except January and February.

"June 25 a death from 'diarrhea sospechosa' is recorded; a second from the same cause July 3, 1903, and from that time on to July 19, 1903, 18 such cases are entered. The first diagnosis of cholera was noted July 21, 1903. The cholera deaths were as follows: July, 149; August, 155; September, 6; October, 2; the last case October 8, 1903, although there were suspicious cases as late as November 14, 1903. Some 200 children had been vaccinated in December and January up to the time of my visit. A public vaccinator arrived January 19, 1904. One cart is employed at 30 pesos per month.

"San Jacinto, now a barrio of Manaog, was not closely inspected. Passing through it on the way to Twin Peaks, I thought it was a clean little town. A municipal policeman told me that there had been from 1 to 3 deaths a day from smallpox in a barrio between San Jacinto and Manaog, called Lomni, but that the epidemic was declining now in all barrios and had disappeared from the population.

"Salasa is a very clean little town. There have been no deaths from smallpox since the military occupation of the place, during which time everybody was vaccinated. Across the river, however, in a village belonging to Lingayen, there have been several cases lately, and at least 3 deaths.

"Cholera began July 9, 1903, and deaths were as follows: July, 89; August, 21; September, 9; date of last case, September 13, 1903. The commonest diseases and the most frequent causes of death are malaria and convulsions of children. The total deaths were:

October, 26; November, 18; December, 18. The population is 8,768. Annual death rate, estimated from the three months named, is 28.1.

"Aguilar, distant about 6 miles from Salasa and recently incorporated with it, is fairly clean. The Salasa board of health has not yet decided in what way it shall look after the sanitary work in this place or how the diagnosis shall be verified in deaths occurring there. The same problem confronts other towns in all the provinces visited, except Benguet, owing to the recent consolidation of municipalities. Aguilar has a parochial graveyard, a convent in charge of a cura.

"There were no deaths from smallpox in 1903. The first case of cholera appeared August 1903, preceded by 12 deaths from 'stomach ache,' all in adults. Total cholera deaths, 29, all in August; last case, August 15, 1903. The population is 7,774. The annual death rate, based on the number of deaths in October, November, and December, is 20.10.

"Mangatarem is a clean-looking town, well laid out in broad, shaded streets. Its sanitary condition, for a Filipino town, is good. No meetings of the board have been held since December, 1902. The elected member is unable to attend and the school teacher has never been nominated. This is unfortunate for the board, as the American school teacher is always a valuable member.

"Some 600 vaccinations have been performed since November, 1902; 9 since January, 1903. The presidente de sanidad had the idea that the vaccine virus had to be bought by the town, and was waiting, he said, until the council approved his estimate of 70 pesos for the purchase before going on with the work. There were deaths from smallpox every month from April to July, but there have been none since, according to the register, and there were no cases at the time of my inspection, so far as I could discern.

"Cholera prevailed from July 17, 1903, to August 28, 1903. Malaria is the commonest cause of sickness and death. Both here and at Urbistondo, across the river, beriberi occurs oftener than in other towns. The population of the town is 12,894. Its death rate is estimated from the number of deaths in October, November, and December, 1903, and is 17.8. The death register is a copy of the padre's book, diagnosis and all.

"Urbistondo has had no health officer since March, 1903. Malaria is the chief cause of death and sickness here. A large, deep gully always containing more or less water, winds through the town. Smallpox did not appear here until July 10, 1903. There was a second case, death occurring, in August, and then no more until 1, December 30. It is very doubtful if this second was correctly reported.

"Cholera extended from July 2, 1903, to September 3, 1903, causing 55 deaths.

"The statistics for October, November, and December, such as they are, indicated an annual death rate of 17.8. The population is 7,393.

"Two other distant barrios of Mangatarem, Casilagan and Lavera, the latter a small rancheria of Aetas Indians, were visited without the gain of any information as to sanitary affairs, except a better idea of the difficulties under which this work must be carried on in the provinces.

"An estimate of the annual death rate and history of cholera in the year 1903 follows:

"In the province of Pangasinan there occurred in thirty-one towns, with a population of 379,238, the following number of deaths from the diseases named during the period of June 1 to December 31, 1903:

Disease.	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Malaria	258	333	227	110	85	98	1,111
Smallpox			93	103	111	165	472
Tuberculosis		26	52	41	42	48	209
Infantile convulsions	203	291	222	43	32	31	822
Lack of care					2	4	6
Senile debility		14	2	5	4	4	29
Dysentery	187	388	198	31	14	7	825
Eclampsia			31	50	32	43	156
Intestinal catarrh					4	6	10
Meningitis				1	3	6	10
Beriberi				1		2	3
Dengue	57	84	13				154
Enteritis	94	20	28				142
Gastric fever	19						19
Pneumonia		13					13
Total	818	1,169	866	385	329	414	3,981

"There occurred also in the province 4,688 deaths from cholera in thirty-five towns and 1,643 deaths from smallpox in thirty-seven towns from July 1, 1903, to December 23, 1903, when the last cases were registered."

Dr. A. Sisson, acting president of the municipal board of health of Lingayen, Pangasinan, reports as follows:

"According to reports received from the various municipalities of this province, the epidemic of cholera began on the 1st of July, 1903, in the town of Dagupan, where 4 fatal cases occurred. From that date cases have occurred in the remaining towns of the province, this with a certain irregularity, since in passing over the province it skipped certain towns only to return and attack them at a later date. It required some two months for the disease to pass over the entire province, the last town attacked being Urbistondo, in which the first case appeared on the 20th of August, 1903.

"The mortality of this epidemic as compared with that of 1902 is relatively less. The disease reached its height in July, August, and September. After these months isolated cases appeared in some of the towns up to the month of November, in which the disease disappeared. As will be seen from the attached table of cholera, the towns which suffered most severely were Urdaneta, Villasis, San Carlos, Dagupan, Mangaldan, Calasiao, and Manaoag.

"The provincial board of health being informed that cholera had again appeared in Manila, Aparri, Pampanga, and other points in the archipelago, adopted on the 22d of May of 1903 rules and regulations tending to prevent the propagation of cholera in case it should again occur in Pangasinan. These instructions were transmitted to all the towns of the province in order that they might be adopted and strictly complied with. Cholera reappeared as stated above. The instructions referred to were immediately put into effect. These consisted in the appointment of sanitary inspectors, disinfectors, quarantine guards, and in the formation of burial corps. These employees were to commence their work immediately upon the appearance of cholera in the municipalities. It was further decided to establish hospitals, if this should be necessary, in addition to the disinfection of houses in which cases of cholera might occur, and the quarantining of contacts. In the regulations above mentioned it was stated that the sanitary inspectors should be provided with medicines for those whom they might find ill in their respective districts, the administration of medicines to be under the direction of the president of the municipal board of health. Certain of the towns, on account of lack of funds, were unable to adopt these measures. In these cases the provincial board of health, having received due authorization from the provincial board, appointed sanitary inspectors and disinfectors and sent them to the towns in question with necessary medical supplies and disinfectants.

"In Lingayen, whose board of health I happened to direct, the regulations already mentioned were adopted and complied with, and during the epidemic, which commenced on the 2d of July of 1903, and continued to the 22d of October of the same year, these sanitary inspectors and disinfectors rendered service. The number of employees was reduced as the number of cases decreased. From the beginning of the epidemic down to the middle of the month of September there was an average of from 3 to 4 deaths every day, but after the latter date cholera decreased in such a manner that on the 22d of October, the date on which the last case occurred, a considerable number of days had elapsed without a single death. Cases of cholera also appeared in the provincial jail, but, thanks to the immediate isolation of those attacked and disinfection of the contacts and of the jail itself, there occurred but 3 deaths. Fearing that the disease might develop among the prisoners, the provincial board of health recommended to the provincial board the appointment of a temporary sanitary inspector, who would render service in the jail. The recommendation was approved by the board. The sanitary inspector was appointed and continued to render service until it was plain that he was no longer required. In this epidemic and in the one of the previous year the mortality was not so great as in the other towns."

"PROVINCE OF LA UNION.

"This province, as a whole, is cleaner than any other I have inspected. Bangar is the only town which is conspicuously dirty. With the exception of Tubao, Naguilian, and Baluang, all the important places are situated near the coast. They are all much alike as to location, size, degree of cleanliness, common diseases, native and church architecture. Boards of health exist in all these towns except Baluang and Tubao. That in Bangar has been organized since my visit.

"San Fernando, at the present time, is going backward rather than forward in sanitation. Some regulation of water-closets is much needed. There is a possibility that the town may attempt a modified pail system. In fact, such a system is now in use on a small scale.

"Tubao was not visited. In conversation with the school-teacher and the presidente, whom I met at Agoo, I learned that there have been a few mild cases of smallpox recently but no deaths. No vaccinating was done in 1903. The streets are in need of attention on account of weeds and rubbish. No carts are employed.

"According to the municipal records, cholera in 1903 appeared in the following towns in the southern part of the province: Bauang, Agoo, Rosario (barrio of Santo Tomas), and Santo Tomas. Bauang had 17 deaths from that cause between July 18 and August 21.

The cases in Agoo occurred in October. Rosario had 33 deaths from July 14 to October 15. There was some question as to the diagnosis in these cases, but the disease was probably true cholera, as the majority of cases were in adults entered as having died 'from cholera, one day sick;' 'cholera, twelve hours,' 'cholera, six hours;' etc. Santo Tomas had 27 cases between September 8 and October 19.

"The commonest diseases throughout the province are malaria, dysentery, and convulsions of children.

"The division superintendent of instruction rendered valuable assistance in this province in regard to vaccination and the elimination of contagious diseases.

"Cases and deaths from smallpox from July, 1902, to January 22, 1904.

Town.	Cases.	Deaths.	Town.	Cases.	Deaths.
San Fernando	65	41	San Juan	56	39
Bauan	19	9	Bacnotan	10	3
Naguilian	35	26	Namacpacan	32	16
Cava	30	17	Balacan	32	11
Aringay	10	5			
Santo Tomas	8	5	Total	297	172

"CHOLERA DATA FOR THE MONTH OF OCTOBER, 1902.

"In certain barrios of the town of Santo Tomas, in the last ten days of September, several suspicious cases of diarrhea occurred. Owing to the remote position of these districts and to the fact that the cases were tardily reported, it was not possible to determine the nature of the disease until the 1st of October, there occurring in the meantime 35 cases and 32 deaths. Cases appeared in the barrios of Linog, Malobago, Namonitan, and Baybay, the disease disappearing on the 23d of the month of October.

"In October, 1902, the cholera appeared in Agoo, existing there until the 25th of the same month. Forty cases and 35 deaths occurred in Agoo in the barrios of San Pedro, San Joaquin, San Augustin, Nazareno, San Antonio, San Jose, San Nicolas, and Macalba.

"The disease did not assume an epidemic character, since in no one house did two cases occur, excepting in the case of the steward of the priest of Santo Tomas, who succumbed twenty-four hours before his wife, both dying of cholera.

"In view of the character assumed by the disease it was diagnosticated as 'cholera nostras' rather than Asiatic cholera, its cause being attributed to the rainy season and the lack of hygiene. As soon as the people commenced to use boiled water the disease ceased.

"In fourteen towns, with a population of 125,814, there occurred the following number of deaths from the diseases named during October, November, and December, 1903:

Disease.	Oct.	Nov.	Dec.	Total.
Cholera	43			43
Diarrhea	10			10
Dysentery	21	18	6	45
Enteritis	8	16		24
Enteric and stomachic diseases	4		2	6
Infantile convulsions	28	24	20	72
Malaria	48	40	47	135
Measles	3			3
Meningitis		6	4	10
Smallpox	23	8	20	51
Senile debility		6	9	15
Tuberculosis	18	17	11	46
Typhoid fever	2	2	2	6
Total	208	137	121	466

"PROVINCE OF BENGUET.

"This province was inspected only in passing through it to Union. The following information was obtained chiefly from the provincial records at Baguio.

"The death rate in 1902 was over 50 per 1,000, due to the invasion of cholera. The rate for 1903, based on fairly accurate returns for the whole twelve months, was approximately 13 per 1,000, which is probably close to the normal. 'Muerte natural' is the most frequent explanation. Then follow in the order given smallpox, calentura, and dysentery. There

were 69 deaths from smallpox. So far as known, there are no cases of the disease in the province at this time. There was no epidemic in the year 1903. One suspicious case, treated as cholera, occurred at Baguio, but only 1. A common cause of death, in the local nomenclature, is 'pasua.' The term seems to cover bronchitis, pneumonia, and tuberculosis.

"The natives seen around Baguio and on the trail are splendidly developed, well nourished, and robust. The average age at death, without taking into account those who die in infancy, is very low.

"A general vaccination should be done here if possible. Judging from groups examined on the trail to Naguilian, a large number, even of the adults, have never been vaccinated.

"The customs and habits of the people constitute too intricate a subject for a brief investigation.

"THE BENGUET ROAD.

"The greater part of the work now going on is done at an elevation of from 1,000 to 2,000 feet, in the canyon of the Bued River. The road is shaded during the greater part of the working day and the air is cool and bracing to a degree that is noticed at once by the traveler who goes up from Dagupan. The rainfall is heavy during the season and showers are not uncommon at other times. Vegetable growth is rank and dense.

"By far the commonest diseases which are brought to the surgeon's attention are malaria, diarrhea, and dysentery. Following these come tropical ulcers, wounds, and injuries. Beriberi, if the disease is really beriberi, is extremely common at Camp Three among the Chinese and Japanese. I was not able to satisfy myself as to the significance of certain ill-defined symptoms in some 20 or 30 Japanese examined while they were at work on this road. As this place is likely to be the location of a very large camp as headquarters are moved, the subject is worthy of further investigation. Seven deaths from beriberi at this camp were recorded in the months of November and December out of a total of 13.

"There were 8 or 10 men in the hospital at headquarters and 2 at Camp Three. Those in the main hospital were cases of malaria, dysentery, minor wounds and injuries, and one of tuberculosis. The 2 cases at Camp Three were 1 of beriberi and 1 of dysentery. One case, probably beriberi, was in the hospital at Camp Four. No men sick in quarters.

"The main hospital at Twin Peaks, headquarters, is very well supplied with medicines and surgical dressings, but insufficiently equipped with cots and bedding. A proper supply, however, of all necessary articles was said to be on the road. The hospitals in Camp Three and Camp Four need better accommodations for sick and injured and some few of the simple conveniences for treating wounds. Each of these three hospitals is in charge of an American doctor. In addition there are four hospital-corps men and an attendant at headquarters, one hospital steward each at Camp Three and Camp Four, and one hospital steward at Doud's Camp, Camp Three-and-one-half, where there is no hospital.

"The ration is sufficient and well prepared. One cook, with helpers, is allowed to every 20 or 25 men in a mess.

"The water supplied at headquarters and Camp Four would be above suspicion anywhere outside of the Tropics. It is ordered boiled, and the men are forbidden to drink from the river. These orders are as well carried out as is possible under the circumstances. Running through Camp Three there is a small, shallow stream which might easily be polluted from a portion of the camp situated on the hill above it, and it is positively certain that this stream is and will continue to be used by many of the laborers in spite of orders and policing.

"Ten hours labor is expected of all nationalities alike each day, and are generally put in, even during the rainy season.

"The sanitation of the road and its various camps is under the direction of the chief surgeon and his medical assistants, aided by the regular police force, a special sanitary inspector, and a daily detail from each camp, in addition to which each gang does ten minutes general cleaning of quarters every morning before going to work. All camps are supplied with water-closets. The buildings, as a rule, are sufficient for shelter and protection. Some Chinese quarters are too crowded at Camp Three.

"Cholera appeared twice on the Benguet road in the year 1903 and each time ran a short course. The first appearance was from August 3 to 9, during which period it was the cause of 8 deaths, as follows: August 3, 5 cases; August 4, 2 cases, and August 9, 1 case. November 14 it appeared again, disappearing November 16 after causing 4 deaths.

"The average number of men employed was: August, 972; October, 2,831; November, 2,309, and December, 1,695.

"DISEASES AMONG DOMESTIC ANIMALS.

"There are none in the provinces of Pampanga and Tarlac, according to the best information I could obtain.

"*Province of Pangasinan.*—An epidemic of opthalmia, mild in character, is said to prevail among fowls in Lingayen. In San Quintin, Tayug, and other towns in that part of the province, there is an epidemic disease among hogs, now declining, characterized by opthalmia and general diarrhea. The disease lasts from one to three weeks and shows a mortality of about 50 per cent in untreated cases. A case of surra was reported at Bautista a few days before I was there, December 15, 1903. Binalonin had some cases of rinderpest as late as October, but has none now. The board of health of Calasiao, November 23, 1903, took official notice of the presence of epizootics in this town.

"*Province of Benguet.*—A native by the name of Mateo, living near Baguio, within the two weeks preceding my visit, January 14, 1904, lost 5 carabaos from a disease which was probably rinderpest.

"*Province of La Union.*—In the month of December 5 horses, 5 carabaos, and 2 cows died in the town of San Juan and its barrios, presumably of surra and rinderpest. At Baluan the presidente stated that since September they had lost some 50 or 60 horses of a disease which he called 'lamperones.' It is a disease which is characterized by a tumor and swellings and generally lasts from one to three weeks. He also reported a few cases of rinderpest in cows. In Bangar there are said to be a few sick carabaos, but no sick horses or cows. In this connection it is important to note that Doctor McMullen, veterinarian, board of health, found a number of cows with the symptoms of anthrax at Tagudin, Ilocos Sur, just across the river from Bangar.

"PROPOSED BOARD OF HEALTH HOSPITALS.

"Pampanga wishes to have one of these hospitals at San Fernando. The advantages which this town presents and the generous aid which would be given by the province are set forth in a resolution of the provincial board.

"The province owns the site of a former Spanish military hospital, but a better site could, in my opinion, be selected for the proposed hospital. No one building of sufficient size is available, but there are two adjacent houses near the old town hall which could be had and which would be sufficient for a temporary institution.

"Angeles, also in Pampanga, is an important trade center and offers certain hygienic advantages. Ground would be given by Doctor Mesina. The Dagupan town council considered the subject and passed a resolution. I do not think there is any place in this town which would be suitable for a hospital of the kind contemplated. On the other hand, if a site were chosen on the beach, either here or at Lingayen, a well-appointed hospital would relieve both the civil hospital at Manila and the sanitarium at Baguio. Ground could be secured adjoining the constabulary headquarters on Lawton Beach. No building suitable for temporary use was found. The following advantages are presented by Lingayen, the capital of the province:

"1. A good hygienic site could be provided if a location on the beach were desired; a fine situation, easy of access, could be secured and the road to it kept in good condition.

"2. Temporary quarters would be provided during the construction of the permanent hospital.

"3. The town has a plant for distilling water, which would be available for the use of the hospital.

"4. An ice plant is projected.

"5. The town being the seat of government, a number of advantages result, among them the certainty of getting reliable transportation for doctor or nurse, without cost, in case of emergencies.

"6. There are 48 government employees in the various offices and schools, 20 of whom are Americans.

"7. The town draws from as large a surrounding country as does Dagupan.

"8. Daily mail and express communication with Manila.

"San Fernando, province of Union, would give ground for a hospital and probably would contribute toward the cost of buildings. A suitable building could be rented for temporary use.

"CUSTOMS AND HABITS.

"An almost absolute ignorance and disregard of the laws of health characterizes the unenlightened portions of the communities visited. From conversation with Spaniards and some Americans who have lived in the provinces for a number of years, there is reason to believe that some progress is making, however slow, in this respect. Particular customs of interest are rare. I may, however, mention the following, not vouching for their observance outside of the places where I learned of them:

"1. A lighted lamp is placed under the house where a woman is in labor.

"2. A teaspoonful of castor oil is given a child at birth.

"3. The colostrum is considered harmful and is not given. Repeated doses of equal parts

of sweetened water and an infusion of some bitter leaves are given until the milk secretion is established.

"4. Additional food, in the form of cooked rice, is generally given from the age of 3 or 4 months in order that the child may grow faster. Lactation is continued to the age of 12 to 18 months.

"5. A long thorny vine is stretched around the supports of a house where there is a case of smallpox to keep the disease from attacking the other members of the family.

"6. Processions of singers go about the town in cholera epidemics singing prayers for relief to St. Roque.

"7. Disinfection is accomplished by burning a handful of guava leaves in a brazier in the house or underneath it. One of the board's employees, a municipal presidente de sanidad, commented indignantly on this custom. His own method is to burn at least two spoonfuls of sulphur.

"Very few towns are supplied with sufficient disinfectants to disinfect even the first few cases of an epidemic. Almost all the local presidentes de sanidad need detailed practical instructions in methods of disinfection.

"In this connection it may be noted that the people have a peculiar horror of the smell of carbolic acid. So far as possible it would be better to use other disinfectants in their houses.

"Some provisions for giving medicines to the poor, free of charge, first of all quinine, would be a great benefit.

"Blank burial permits with proper stubs on duplicates issued to all municipalities would make statistics somewhat more reliable.

"The railroad water-closets from San Fernando to Dagupan, with not more than one or two exceptions, are in a bad condition. Many of them are completely ruined and almost all are extremely filthy.

"At Monaog, Pangasinan, and in some other places in that province and in Zambales, there was, in 1888, an epidemic of some disease, not cholera, which was even more fatal than the cholera of 1883. It was not influenced by quinine. It began with a chill, was followed by a high fever, and was almost invariably fatal in from two days to two weeks."

REPORT OF SPECIAL SANITARY INSPECTION OF THE PROVINCES OF SURIGAO, LEYTE, AND SAMAR.

Dr. Robert L. Bartlett, medical inspector, under date of April 14, 1904, submits the following report of his tour of inspection of the provinces of Surigao, Leyte, and Samar:

"The general health of all three provinces is comparatively good, and has been for some months.

"The epidemic diseases among men seem to be nearly stamped out, with the exception of isolated cases or groups of cases of smallpox, though quite recently smallpox has assumed a rather severe aspect in southwestern Surigao.

"Among the domestic animals, both surra and rinderpest seem to have practically disappeared. In each of these provinces it is difficult to arrive at any accurate conclusion, because of the scarcity and inaccuracy of records and of the small number of competent observers who have reported the prevailing diseases and the deaths resulting therefrom.

"It can be said that the efforts of the insular board of health have borne good fruit, for there is an inclination, plainly to be seen, toward a better condition of sanitation, in spite of the hostility and indifference of a great number of the people toward measures which have been instituted for their good.

"In these three provinces, the proper formation and organization of municipal boards of health, is a difficult problem. This difficulty seems to be composed of several factors:

"1. As the law stands, it requires a graduate or undergraduate in medicine to act as president of municipal boards of health. This prevents many municipalities from organizing health boards, as no graduates or undergraduates are available.

"2. In certain towns, the people, and some of the officials, fail to recognize the importance of a properly conducted health board.

"3. The funds in municipal treasuries available for such purposes are frequently insufficient to pay the salary of a competent man.

"4. The means of transportation are often so poor that presidents of provincial boards of health can only rarely visit some of their municipalities.

The municipal boards of health now formed have met with considerable difficulty in carrying on their work, partly because they have not been sufficiently instructed how to proceed and partly because of the fact that one or more of their number have been withdrawn and sent to other places by their respective departments, as, for example, in cases of the school-teachers and the contract army surgeons.

"The work of the provincial and municipal health boards has been carried on largely in conjunction; thus in many cases it is not possible to determine how much either is responsible for some of the work accomplished.

"SAMAR.

"*Provincial board of health.*—Dr. G. I. Cullen is president, and also president of the municipal board of health of Catbalogan; supervisor, R. E. Scott. The provincial board of health was organized in the spring of 1902. The meetings are held according to Act 307, and special meetings, as the occasion requires. Their method of keeping records is quite systematic and is the best I have yet seen. A book with the minutes of the bimonthly and special meetings is kept, as is also a book for the letters and telegrams received and sent. A card-index system is used to record the monthly reports received from the various towns in regard to the births, deaths, and epidemic diseases occurring in the said towns. A record is also kept of all persons vaccinated by the provincial and municipal vaccinators. A report of the health condition is rendered to the president of the provincial board of health daily by each town connected with Catbalogan by telegraph, and monthly by all other towns, these reports being sent either by boat or courier.

"*Municipal health boards.*—There have been eight organized in accordance with Act 308, but at present there are only five in which the president has the qualification required in the referred-to act. These are: Catbalogan, president, Dr. G. I. Cullen; Gandara, president, Dr. L. D. Bell, contract surgeon; Borongan, president, Dr. F. S. Griffis, contract surgeon; Bobon, president, Dr. Magio Alunes; Guiuan, president, Doctor Card, schoolteacher.

"The following municipalities organized health boards, but at present are without physicians as presidents. They have been removed for some cause, or resigned: Calbayog, Henry W. Rambo, undergraduate, resigned; Señor Scoda, practicante, acting. Catubig, Dr. W. F. Richardson, contract surgeon, transferred by military department to another province. Laguan, Dr. M. F. Marvin, contract surgeon. The commanding general refused to approve his detail.

"Under the consolidation act Samar has twenty-five towns, and of this number fully a dozen could not afford to pay the salary of a physician, such as would be needed for his support, as the opportunity for private practice would be very small. In a few of the other towns it would seem best not to attempt to institute any radical sanitary reforms at present, owing to the unsettled condition of the people.

"*Work accomplished.*—The work accomplished consists principally in the quarantining of the towns of Basey, Catbalogan, and Calbayog, in June and July, 1902, when determined measures were made to prevent the spread of cholera. Public water sterilizing stations were established in most of the towns, and people compelled to use this water. Wells were guarded, and in some cases were filled up and destroyed. In the larger towns the houses in which cholera had occurred were disinfected, and in some cases were burned. A cholera hospital was established at Catbalogan, also a quarantine station.

"Vaccination has been carried out quite extensively in most of the coast towns. Permission has been obtained for the utilization of prisoners in cleaning up the streets and the towns in general.

"The buying and distribution of medicine and disinfectants, and the explanation of the proper use of same, were practiced during the epidemic of cholera.

"The drainage of the towns of Catbalogan, Calbayog, Borongan, and Tanany, has been perfected, and in the first-named place considerable land has been filled in and much swampy land reclaimed. An attempt has also been made to encourage the people to build suitable closets on the pail system order, but at present little has been done in this line.

"*Hygiene and sanitary condition of towns.*—While there are many things which do not comply with the American idea of good sanitation, still it can be said that most of the towns are in a fairly good sanitary condition. The condition of the larger and better towns can be grouped together, for the purpose of description, as their hygienic condition is very similar. These towns are Calbayog, Guiuan, Catbalogan, Bobon, La Grange, Taguan, and Borongan. These are all situated on the coast, not far above sea level, and, with the exception of Borongan, have sandy soil. Their water supply is from springs, river, and rain water. The latter is caught in metallic or stone cisterns, which in most cases are in good condition. With the exception of two or three months of the year, the water supply seems abundant. The streets in these towns are, as a rule, well laid out and kept fairly clean. All of these towns have one or more paved or macadamized streets. This is especially true of Catbalogan and Taguan. In most of the towns gutters have been built, and the drainage is good. There is the usual number of houses of strong material in each town, the rest of the houses being the usual nipa and bamboo shacks. There is plenty of space between the houses, and the yards are kept in a fair condition. Most of the sleeping rooms are well raised above the ground.

"*Disposition of slops, garbage, and excreta.*—Slops are thrown out of the window, or into the gutters or drains.

"Garbage is collected at more or less regular intervals and thrown into the sea or burned on the beach.

"Excreta: The closets in the better class of houses are on the pail system order, sand, and in a few cases lime, being used to cover the excreta. Most of the natives have no regular closet, simply using holes in the ground.

"The condition of the stores is good, especially the Chinese tiendas. Many of these have been recently whitewashed. Each of these towns has a municipal market, although in most of them very little food is offered for sale. The markets, as a rule, are kept clean. There are but few cattle, carabaos, or horses in this province, and the streets, therefore, are not soiled from this cause.

"It is claimed in all these towns that ordinances have been passed by municipal councils requiring animals to be kept off the streets, but from the appearance of the large number of dogs, hogs, and chickens it would appear that this ordinance is not enforced.

"In the towns of Catbalogan and Calbayog part of the land is quite swampy, but drains have been made, and the condition is rapidly improving. The water taken from most of the wells in these towns is rather brackish, owing to the nearness of the sea, and is therefore not used for drinking purposes.

"In the smaller towns of Tubig, Catubig, Oras, Basey, Balangiga, Capul, Santo Nino, Villareal, and Almager, there is very little attempt made in keeping the towns clean. The streets are in poor condition, and there has been very little attempt made at artificial drainage.

"LEYTE.

"The provincial board of health was organized in 1902. The present members are: Dr. Harry Baker, president (since resigned); Doctor Arse, municipal physician (now acting president provincial board of health), and provincial treasurer and acting supervisor Conrow. Doctor Baker was just on the point of leaving for Manila when I arrived, but he informed me that he had not as yet succeeded in getting his records in shape. The board is said to hold regular meetings, but only a few minutes of same could be found. A record is kept of letters and telegrams received and sent, and there is also an incomplete record of vaccinations. There is a number of monthly reports from the various towns in the province, giving births, deaths, and marriage records. These are very incomplete.

"There are but two towns having organized boards of health, viz, Tacloban and Bay Bay, Doctor Arse being president of the former and Doctor Llora of the latter. The records in both of these towns consist simply of births, deaths, and marriages, and reports of vessels entering and leaving (i. e., bills of health).

"Somewhat over one year ago municipal boards of health were organized in thirty-four towns in the province, but as the presidents of the same did not possess the necessary qualifications required by Act 308, the provincial treasurer refused to allow the payment of their salaries, and the various boards were soon dissolved. With the exception of Tacloban, Ormoc, and Bay Bay, there are no towns in which resides a physician, and scarcely any towns have practicantes.

"*Work accomplished.*—The usual quarantine of the coast towns, notably Tacloban, Ormoc, Palompon, and Bay Bay, during the cholera epidemic. The disinfection of cholera houses and the establishment of a cholera hospital in Tacloban. Public sterilizing stations were opened. The prohibiting of the importation of fruit and vegetables while cholera was prevalent. There has been considerable vaccinating done, and at present two vaccinators in southern Leyte are vaccinating about 1,000 persons a week. The prisoners are utilized for street cleaning purposes in Tacloban. Drugs and disinfectants were distributed during the cholera epidemic.

"*Hygiene and sanitary condition of towns of Leyte.*—The entire province of Leyte seems to be in a very good condition. All the towns on the coast are in good condition with the exception of Carragara, which is low, poorly drained, and where much rubbish has been allowed to accumulate. The west coast towns are in excellent condition. This is especially true of Ormoc, Bay Bay, and Palompon.

"SURIGAO.

"The provincial board of health was organized in 1902, and consists of Dr. Antonio Fernando, president; Dr. Pedro Diaz, municipal physician, and Mr. G. Benedict, treasurer and acting supervisor. Meetings are held bimonthly and are said to take place as specified by law, but I could find no record thereof. This may be due to the fact that Doctor Fernando was in Manila at the time of my visit. I could discover but few records. These were letters received and sent, also telegrams received and sent, and some unclassified reports of deaths, births, and marriages received from municipalities.

"*Work accomplished.*—The usual work in suppression of cholera and the quarantine of the towns on Dinagat Island, the more or less continuous vaccination, the appointment of municipal health boards, and the cleaning up of a few of the towns, principally of Surigao.

"*Municipal boards of health.*—Every town in the province, thirty-four in number, has a health board, but only two are organized according to Act 308. These are the boards of Surigao and Butuan. Señor Pedro Diaz is president of the former and Señor Canuto Rosales of the latter. As far as I can learn, the municipal boards of health have done nothing except to send in their birth and death reports and to aid in vaccinating.

"*Hygiene and sanitary condition of towns.*—The town of Surigao is low, level, and sandy, in some places swampy, but a system of drainage was instituted in Spanish times, and at present the town is fairly well drained. The streets are clean, although animals are allowed to roam about. There are very few closets of any kind in town. The people defecate in holes or on the ground, using earth or lime to cover the excreta. The water supply is poor, and except for a few springs back of town and a few wells, the water has to be brought from an island across the bay. The sanitation in most of the towns of this province has been very much neglected. In this province carabaos and hogs are given free use of the ground beneath the houses.

"DISEASES COMMON IN LOCALITY.

"In all three provinces the same class of diseases prevails, and except for certain local conditions, as prevailing winds, presence of swampy land, amount and character of the food and water supply, these diseases seem to be present in about the same relative proportion. The variation in the number of deaths caused by certain diseases is largely due, I believe, to the differences of opinion among those reporting the disease.

"The following diseases are common to all localities: Pulmonary tuberculosis, enteritis, meningitis, beriberi, smallpox, acute and chronic bronchitis, malarial fevers, dysentery, acute and chronic rheumatism, leprosy, syphilis, insanity, and hysteria.

"In the north of Samar, especially at Catarman and Catubig, there prevails a very severe type of malaria, especially noticeable during the change of the monsoon in April and May. Surigao has malaria of a less virulent type during the early part of the southwest monsoon in May and June. In Tubig and Catarman, in Samar, beriberi prevails very extensively and is of a very virulent type.

"THE AVERAGE DEATH RATE—PRINCIPAL CAUSES.

"For the year ending June 30, 1903, in Samar, where the data are more nearly complete, the mortality for the whole province is given as 59 per 1,000. In Leyte and Surigao it is not possible to get figures for the whole of the provinces, but using those records available, we get a mortality of 53 per 1,000 for Leyte, and 45 per 1,000 for Surigao. The figures I believe to be much below what really exists, as I believe the population has been greatly overestimated in places and that all deaths are not recorded, especially those occurring in remote barrios.

"The chief causes of death are: Cholera, smallpox, malarial fevers, beriberi, phthisis, dysentery, eclampsia, convulsions, bronchitis.

"The mortality in labor cases is undoubtedly very high both for mother and child. The mortality among the former being 10 to 15 per cent, and for the children about twice as high. The records in many places show a much less mortality than this; in fact, in many places no mortality at all is credited to this cause. The high mortality is undoubtedly due to the fact that skilled attendants are seldom employed in confinement cases, and deaths result from faulty positions, exhaustion of prolonged labor, infection, hemorrhage, and eclampsia.

"Leprosy, I believe, is quite common in these three provinces, but there are very few records of same. Here the difficulty is very great in securing data, owing to the fact that the town officials are loath to disclose the names and numbers of lepers in their respective towns, fearing that they will be removed from the province. The same statements apply to insanity. Of two towns of Samar, Oras reports 80, and Basey 92 cases of leprosy.

"DISEASES AMONG DOMESTIC ANIMALS.

"No figures are obtainable, but all of these provinces have suffered with both surra and rinderpest. In Samar practically all of the animals seem to have died. During the year ending June 30, 1903, there were reported in Samar 1,986 animals dying from all classes of disease. Leyte lost a great many carabaos and many horses. Some claim the horses died of surra, while others claim the cause of death was glanders. Many chickens have died from what appears to be chicken cholera. Surigao has also lost nearly all of her animals, as well as chickens. At present very few animals are dying. The general estimate of people in these provinces places the animal mortality at from 85 to 90 per cent.

"HISTORY OF CHOLERA EPIDEMIC.

"The cholera first appeared in Tacloban, Leyte, on May 9, 1902, and during the remainder of that month 39 persons died of the disease and 18 others died of 'suspected cholera.' The disease spread rapidly up the east coast until practically all the towns were infected. The following month (June) 34 deaths occurred in Tacloban from cholera, and 27 others were recorded as 'natural.' The west coast of Leyte had also become infected, but the records covering this period are not available to show to what extent they were infected. The belief prevails that the towns of Ormoc and Bay Bay were infected by natives fleeing from Cebu. The few records covering the epidemic show that it was most prevalent in January, February, and March of 1903.

"On May 29, 1902, five natives escaped from a ship infected with cholera which was in quarantine in the harbor of Tacloban, Leyte. They made their way in a barota to the town of Basey, in southern Samar. The night of their escape one of the men died of cholera, and on the following day two others died, and their bodies were hidden in the brush. The people living in the house in which they took refuge contracted the disease and died. From this as a focus it spread over the entire town, and from there along the south coast to Guiuan; from here north along the east coast to Hermano, to Lauang, finally reaching San Julian. It next appeared at Calbayog, where it had been introduced from Cebu. The military authorities here adopted a rigid quarantine and thorough disinfection, and the disease was completely stamped out in a little over a month. During the height of the disease it spread to Limbacuanyan Island, where it raged for three weeks before notice was brought to the provincial officials. On their arrival at the island they found a great many bodies, and in fact found the island was almost depopulated. Later the disease developed along the north coast of Samar, and was particularly severe at Boron, Catubig, and Oris. At present, and in fact since the latter part of June, 1903, there has been no cholera reported in this province. For the year ending June 30, 1903, there occurred 9,598 cases of cholera and 5,698 deaths in this province from this disease.

"*Surigao.*—Cholera first appeared on Dinagat Island, northeast of the town of Surigao, in July 1902. The epidemic lasted here until the middle of October. During this time there occurred 113 cases and 58 deaths in the towns of Dinagat, Unip, Sabanay, Libjo, and Milgar, all on Dinagat Island. Libjo and Milgar suffered especially, they having 73 cases. The next outbreak occurred in the southwestern part of the province, at the mouth of the Agusan River. Here the cholera made its appearance on October 25, 1902, the infection having been brought from the town of Manbajao, on the island of Camiguin, by a banca load of people fleeing from the disease. Here in Butuan, and in the adjoining towns of Talacogon, Tubay, and Nasipit, the disease raged with great violence for the next three months, attacking 1,200 persons and causing 966 deaths. In Butuan alone over 500 died of the disease. The active measures taken by the provincial board of health caused its disappearance before the new year. In the latter part of June, and early in July, 1903, Butuan had another epidemic, but of very small proportions, there being but 14 cases and 8 deaths.

"During the month of December, 1902, and from January to March, 1903, the entire east coast was infected, and in the towns of Placer, Bacuag, Taganaan, Claver, Adlay, Taganito, Carrascal, and Canather, there were nearly 1,200 deaths. Largely due to the energetic measures of Doctor Biggar, medical inspector, and of the provincial board of health, it was stamped out by the 1st of April, 1903, but it reappeared on Santiago Island in the latter part of that month, in the towns of Jabonga and Maynit, and also at Tubay. In these places it caused 300 deaths in about two months.

"*Smallpox.*—In these provinces this disease has been present to a greater or less degree for many years. In some places it has been quite prevalent, but not, as a rule, very virulent. In those towns having a military surgeon or other person who conducted vaccinations there has been comparatively little disease.

"For the year ending June 30, 1903, there were, in Samar, 3,989 reported cases and 2,158 deaths. The provincial board of health has vaccinated 7,700, and about 3,000 others of whom no records were kept. At present there are two localities in which smallpox exists, Basey and Laquan. There has been about a dozen vaccinators employed for an average of five months.

"*Surigao.*—There is always more or less smallpox along the east coast and along the Agusan River. During the year ending June 30, 1903, there were 160 recorded deaths from this disease. Over 4,000 persons were vaccinated. At present the disease is quite prevalent along the Agusan River, and quite a number have died at Butuan.

"*Leyte.*—No records available, but there does not appear to be much in the province. All members of provincial and municipal boards of health agree that unless the vaccine is shipped to them on ice, its value is very much impaired.

"CUSTOMS AND HABITS OF THE PEOPLE RELATIVE TO HEALTH AND SANITATION.

"The habits common to the Filipino prevail among the people of these provinces. Their food is largely composed of fruit, rice, fish, and camotes. The fish is, as a rule, of good quality. Aside from eating fresh fish they have several ways of preparing it; one is to split it open, dry, salt, and pack away in layers, to be kept for several months before eating; another way is to clean, boil repeatedly until jellified, then squeezed into large balls, which are stored away several days before eating. Oysters are prepared in the following manner: They are placed in large-mouthed bottles, exposed to the air for about a week, until well putrified, and then considered fit to eat. All kinds of shellfish are eaten, especially such as grubs and sea worms. Raw fish is also eaten.

"Opium smoking is said to be practiced to a very large extent among the natives, especially on the west coast of Leyte. It is also used very largely by the people living in the towns along the Agusan River, in Surigao, where it is said to have been introduced during the first cholera epidemic, the claim being made that this disease could be prevented by its use. There seems to be the usual amount of vino and tuba drinking and betel chewing.

"HOSPITAL SITES.

"*Samar.*—At the capital of Samar, Catbalogan, there is one large building which could be rented for hospital purposes. It is well located on the water front and could be secured at a rental of 60 to 70 pesos Philippine currency per month. Considerable repairing and alterations would have to be made, involving a large outlay. The building is of strong materials, two stories high, with metal roof; the main part 30 by 45 feet, annex 20 by 25 feet. The lower part is suitable for dispensary office. The province is willing to donate land on the water front, just out of the main portion of the town. The especial desire of the province is to build, equip, and maintain a provincial hospital for its own needs, but the provincial board states that it would not care to do this unless assured that the insular government would not interfere with its plans or limit the amount expended.

"*Leyte.*—At the capital of Leyte, Tacloban, there are but two buildings of strong materials that could be secured for hospital purposes. The location of one is hardly suitable, though the other, now occupied by the constabulary, but soon to be vacated, would be fairly suitable. The rent is high, $125 per month, out of proportion to the value of the building. To convert either one into a hospital would be somewhat expensive. The province has a large tract of land on the bay front. It has a fine view, and is swept by cool breezes from all directions. It is sheltered from severe storms by high land on the west. The land is quite sloping and would need considerable grading. It adjoins the military reservation, and is a part of the land the insular government wants for a dock and warehouse. The province is willing to donate this for a hospital site. The one bad feature of it is that the only available water supply is from rain water, but as the rainy season is quite prolonged here it seems certain that sufficient supply could be obtained in this way. The army has a distilling and ice plant.

"*Surigao.*—In the town of Surigao there is no suitable building that could be used as a permanent hospital, but for temporary purposes there are two adjoining buildings, centrally located, which could be secured at a moderate rental. The province is anxious to donate land for a hospital site. There are two pieces of land owned by the province, either of which would make an excellent location. One adjoining the provincial building, directly facing the sea in the center of the town, level, and in excellent condition. The other back a few hundred yards from the town, situated on low hills. This latter has a fine view and good air. Water would have to be brought from across the bay or piped from a large spring some distance back of the town."

REPORT OF THE PRESIDENT OF THE PROVINCIAL BOARD OF HEALTH OF SURIGAO.

SIR: I have the honor to submit herewith my annual report, covering the period from July 1, 1903, to July 23, 1904:

The last case of cholera in this municipality was registered on April 11, 1903. From that date until July 19 no other cases developed, and we believe that we had been freed from the epidemic; but on the 18th of July there was a heavy downpour of rain, and the water, in filtering through the ground, probably removed the germs, which were in incubation in the same, and carried them to the wells where the people obtained their supply of water, thus serving as a vehicle for this new contagion. Up to this time the use of tuba and other substances capable of serving as a vehicle for the infection by carrying the pathogenic germs, and which, in our opinion, could be the cause of a new infection, was still prohibited.

On the 20th of July, 1903, another case of cholera was found in the western part of the *town, and from that time on further* cases occurred until the 17th of August of the same

year. The disease seemed to have increased in intensity during the second invasion. Eighty-two per cent of the persons attacked died, while during the first invasion there was only a mortality of 43 per cent.

This time, too, the epidemic was limited to a small area, where the sanitary condition of the ground and of the wells which supplied water to the people was bad. The borders of these wells had no protection, being on the same level with the ground, and the rain water poured into them after running over the surface. On this occasion almost all the persons who were attacked lived in a small circuit and drank from the water of the said wells.

In view of this fact, upon my recommendation, and with the consent of the municipal council, these wells were closed for public use.

From August 18, 1903, no other cases of the disease developed, and during the whole month of September the health of the town was good; but on the 6th of October another rain, heavier than the former, occurred, and the same thing mentioned in a preceding paragraph again happened with the other wells of the same part of the town, and, notwithstanding the precautions which were adopted, the disease again appeared.

On the 7th of October the first case of this third cholera outbreak was registered, being followed by death. On the next day we were greatly surprised to see that the number of cases had reached 12, with 12 deaths. It was undoubtedly a fact that the infection took place through the water of those wells which had been closed. I was induced to form this opinion by the rare coincidence that in the second and third outbreaks the appearance of the disease was preceded by heavy rains, and that both were confined to a certain limited area.

The other towns of the province were also invaded at the same time as Surigao. The following table shows the total number of deaths that were registered in each of said towns:

Town.	Period.		Deaths.
	From—	To—	
Surigao	Juiy 20, 1903	Nov. 23, 1903	29
Butuan	July 2, 1903	July 31, 1903	8
Cantilan	July —, 1903	Aug. 14, 1903	64
Cabarbaran	July 3, 1903	July 31, 1903	11
Numancia	July 25, 1903	Aug. 17, 1903	352
Dapá	Aug. 3, 1903	Aug. 31, 1903	72
Tago	Aug. 4, 1903	do.....	193
Tandag	Aug. 23, 1903	Sept. 27, 1903	70
La Paz	Aug. 1, 1903	Aug. 30, 1903	58
Loreto	Aug. 11, 1903	Sept. 11, 1903	55
Total			912

At the present time the province is entirely free from the disease.

During the year 1903 an epidemic of smallpox also broke out in the province, appearing in the towns which had suffered from the cholera. During the latter part of that year, and the first months of this year, this epidemic had made so great ravages in these towns that, although the mortality was somewhat less than the cholera, the difference was very slight. We proceeded to vaccinate in nearly all of these towns, the vaccinations being performed by myself or the municipal presidents, and by these means the disease was stamped out from some of the towns.

At the present time the disease still exists in the towns of Butuan, Bacuag, Gigaquit, Claver, and Anao-aon (a barrio of Surigao).

The following table shows the number of deaths caused by smallpox by towns:

Town.	Period.		Deaths.
	From—	To—	
Cantilan	Nov. 13, 1903	Feb. 18, 1904	208
Dapá	Feb. 15, 1904	Mar. 31, 1904	42
Cabarbaran	Dec. 31, 1903	Mar. 15, 1904	205
Butuan	Feb. 7, 1904	June 30, 1904	180
Surigao	July —, 1903		1
Talavera	do.....	Sept. —, 1903	23
Talacogon	Jan. —, 1904	Mar. —, 1904	82
Jabonga	June 10, 1904	July 23, 1904	68
Numancia	May —, 1904	July —, 1904	72
Anao-aon	May 7, 1904	July 26, 1904	22
Bacuag	June —, 1904	do.....	62
Gigaquit	Mar. —, 1904	do.....	43
Claver	June —, 1904	do.....	34
Total			1,042

Vaccination is a measure already known to the people, and they know that it is a preventive against smallpox. They obey willingly the call for vaccination, as the idea has been sufficiently inculcated in the minds of the inhabitants by the experience that they have had in former times, and it is very rare to find among them one who does not show vaccination scars several years old; therefore, in the performance of vaccination very little effort is necessary to induce the people to be vaccinated.

The following is a table showing the number of persons, by municipalities vaccinated by myself, the presidents of municipal boards of health, and the insular vaccinators, and the number of successful and unsuccessful vaccinations:

Town.	Period.		Persons vaccinated.
	From—	To—	
.....	July —, 1903	May —, 1904	1,625
Surigao.....	May 6, 1904	June 6, 1904	2,064
Bacuag.....	June 4, 1904	June 20, 1904	826
Placer.....	May 27, 1904	June 29, 1904	861
Butuan.....	June 7, 1904	July 17, 1904	1,327
Anao-aon.....	July 9, 1904	July 16, 1904	341
Total.....			7,114

Successful vaccinations.....	1,897
Unsuccessful vaccinations.....	5,217

At the present time the towns of Tandag and Tago are infected with dengue and malarial fevers, this latter being of a pernicious character. About two weeks ago I sent to those municipalities a quantity of quinine sulphate in tablets, earnestly recommending to their respective municipal presidents that they persuade the people to take the same in order to check the ravages of these diseases.

In conclusion, I will take the liberty to suggest a plan which, if adopted, will greatly aid our work. The principal obstacle which I have found in the proper performance of my duties during the two years and a half which I have been here is the lack of capable persons to help me in sanitary work. With the exception of the towns of Surigao, Cantilan, Tandag, Hinatuan, Cigaquit, Calbarbaran, and Butuan, where the presidents of municipal boards of health have some ability for the performance of their duties, the towns are without available persons for this kind of work. In the islands of Dinagat and Siargao there is not a single person capable of performing any work connected with sanitation that might be intrusted to him.

I recommend that a sufficient number of sanitary inspectors be appointed for the province whose duties shall be the same as those now performed by the municipal boards of health, and that the province be divided into sanitary districts, each including a certain number of towns, according to their importance and population. One sanitary inspector should be placed in charge of each of these districts and made responsible for the sanitary work in the same. The salaries of these sanitary inspectors should be paid from the insular treasury, at least for the present, as the provincial treasury is short of funds on account of the reduced revenues of the province.

Very respectfully,

ANTONIO FERNANDO,
President of the Provincial Board of Health of Surigao.

REPORT OF SPECIAL SANITARY INSPECTION OF THE PROVINCE OF ZAMBALES.

Dr. Luis Abella, medical inspector, board of health for the Philippine Islands, under date of February 20, 1904, submits the following report of the province of Zambales:

"PROVINCIAL BOARD OF HEALTH.

"The provincial board of health is composed of a president, Dr. Antonio Olba, the provincial treasurer-supervisor, and the provincial secretary.

"This board has issued ordinances about the hygiene of houses, cleaning of yards, streets, squares, and markets, inspection of cattle for public sale, and inspection of ships and sundry articles of commerce, such as leather, etc., sent from this province to Manila, and has recommended also ordinances and steps to prevent infectious diseases, such as cholera and smallpox. Measures have been taken to prevent rinderpest and other cattle diseases. The records of the board are well kept and consist of record of minutes and a book of letters *received and sent*. The president of the provincial board of health is Dr. Antonio Olba,

licenciate of medicine from the Santo Tomas University of Manila. He had arrived only about twenty days before my visit, having been transferred from the province of Bataan, where he had served as president of the provincial board of health for fourteen months. He is an intelligent, capable, and active man. During his short stay in this district he has endeavored to reorganize the municipal boards of health of the various towns, but has not met with success, owing to the lack of capable persons to fill such positions.

"MUNICIPAL BOARDS OF HEALTH.

"*Iba.*—This municipality has an organized municipal board of health, composed of an acting president, Señor José de Castro, practicante, a municipal representative, the superintendent of schools, and the municipal secretary. This board is rather lax in enforcing sanitary ordinances. On stated days of the week the cart owned by the municipality goes through the streets collecting house sweepings, which are afterwards taken out of town and burned. This service is very poor. House inspection is performed by the president himself, aided by the police. The president also conducts the inspection of all shipping. At present there are two vaccinators at work continuously, vaccinating on an average of 120 persons a day. The records are kept in such books as records of minutes, birth record, death record, and a vaccination record. Monthly reports are sent to the provincial board of health. The president, Señor José de Castro, was a practicante of the Spanish army, has no title, and is not registered.

"The town is in an unsatisfactory sanitary condition on account of noncompliance with ordinances. In a certain season of the year, say from November to February, malarial fever makes its appearance, especially among rice collectors, who, having to sleep nights in the open rice fields, are bitten by mosquitoes that infest such places.

"Diseases common in this vicinity are malaria, tuberculosis, and infantile convulsions. The cemetery, surrounded by a wall, is situated outside the town, and is in a bad state of repair.

"*Palauig.*—This town is consolidated with Iba and forms a part of this municipality. This town is not in a good sanitary condition. The closets are neglected, and domestic animals are scattered all over the town.

"*Masinloc.*—This municipality has no organized board of health. The municipal president is in charge of sanitation of the town. Municipal ordinances are enforced and penalties and punishments are imposed upon infractors, but ordinances relating to animals and closets are not complied with. The municipal secretary is in charge of records. Several books are kept, among which are the record of proceedings and the birth and death book. The death book is kept in a confused manner. Monthly reports are sent to the provincial board of health.

"This town is in a fair sanitary condition, but closets are neglected and domestic animals are permitted to go loose in the streets. The diseases commonly observed in the town are malaria, tuberculosis, and infantile convulsions. A good cemetery is situated outside the town.

"*Candelaria.*—This town is consolidated with Masinloc and under the same direction. The town may be considered in good sanitary condition, but, as in most others, closets and domestic animals are neglected.

"*Santa Cruz.*—This town has no organized municipal board of health. The municipal president is in charge of sanitary maintenance of the town. Municipal ordinances relating to the hygiene of houses, yards, streets, and markets, as well as for the sanitary maintenance of closets and the keeping of domestic animals, are in existence, but most of them are not complied with. There are ordinances regulating leather inspection and the inspection of vessels, which are made by the president. Records kept by the secretary consist of a record of proceedings, a death and birth record. Monthly reports are sent to the provincial board of health. Hygiene in this town is neglected and municipal ordinances are not complied with. Common diseases are malaria, tuberculosis, and infantile convulsions.

"*Botolan.*—This town has no organized board of health, as there is no suitable man for the position. The municipal board is in charge of the sanitary maintenance of the town and the enforcement of all existing ordinances. House and yard inspections are performed by the police. No penalties or punishments are imposed on infractors of ordinances. Records are kept by the secretary, and consist of a record of proceedings and a birth and death record. The latter is not kept clearly enough.

"The town is not in good sanitary condition, and, with the exception of the wealthy and educated, the people do not observe the rules of sanitation. Streets are clean, but closets are not. Domestic animals run loose in the streets. The common diseases are malaria, tuberculosis, and infantile convulsions. There is a house in this town of strong materials suitable for a hospital of 50 beds. This is the only house in the whole province suitable for a hospital.

"*Cabangan.*—This town is consolidated with Botolan and under the sanitary regulations of Botolan. The town is unclean and ordinances are not complied with.

"*San Narciso.*—There is an organized board of health composed of a president, Señor Felix Evangelista; a cirujano ministrante, a member elected by the municipal board, a school-teacher, and the municipal secretary.

"There are ordinances relating to the hygiene of houses and cleaning of yards and streets, but some of them are not enforced. Sanitary inspections are made by the president of the board of health, aided by the police. Infractors are fined and punished by the municipal board. Cattle for public sale are inspected by the president of the board of health.

"Records are kept in three books—a record of proceedings, a record of births, and a record of deaths. Monthly reports are sent to the provincial board of health.

"The president, Señor Felix Evangelista, appointed on the 7th of February, 1901, is well known and has a good reputation. He is intelligent and capable and has the title of cirujano ministrante from the University of Santo Tomas of Manila, and is registered under the provisions of Act 310, regulating the practice of medicine and surgery.

"This town is not in good sanitary condition, water-closets are neglected, and animals are allowed to run loose in the streets. Common diseases in the town are malaria, infantile convulsions, and tuberculosis.

"One of the things which attracted my attention was the great number of lepers living principally in the barrio of La Paz. These people are living with their families, caring very little for the danger of contamination. The young and old are afflicted. The cemetery, situated out of town, is in good condition.

"*San Felipe* is consolidated with San Narciso. The sanitation of the town is neglected, as the municipal board has not yet taken action on the matter, and in consequence it is unclean, and domestic animals run loose in the streets. There are also several cases of leprosy in the town.

"*San Marcelino.*—Municipal ordinances relating to the hygiene of houses, cleaning of yards and streets, and the sanitary maintenance of closets exist, but most of them are not complied with. Sanitary inspection is performed by the police. Infractors of ordinances are fined and punished. Records, consisting of several books, are kept by the municipal secretary. A record of proceedings and birth and death books are kept. The death record is not very clear. Monthly reports are sent to the provincial board of health. Streets and yards are clean, but closets are neglected and animals run loose in the streets. Cattle for public sale are not inspected. Common diseases are malaria, tuberculosis, and infantile convulsions. Several lepers were seen in this town, and most of them are believed to be living with their families. The cemetery, just outside the town, is in an insanitary condition.

"*Castillejos* and *San Antonio* have been consolidated with San Marcelino. They are unclean towns, and sanitation receives very little attention. A member of the municipal board is in charge of each town. Pigs and domestic animals are seen on the streets. There are several lepers in the town, who live with their families and circulate freely throughout the town.

"In the town of San Antonio, and on the north of the barrio of San Miguel, there is a place called Carusipan suitable for the establishment of a leper hospital, the place being located about a mile from the nearest barrio and having near it a lake of fresh water.

"*Subic.*—There is an organized board of health consisting of a president, Señor José Imperial, a former practicante during the Spanish régime, who has no registered title; a citizen, and a school-teacher.

"Besides the ordinances issued by the provincial board, there are ordinances relating to the sanitary maintenance of houses, the cleaning of streets, yards, and squares, and the inspection of vessels, which are enforced by the municipal board. Cattle dying of disease are buried with sanitary precautions. Ordinances for the sanitary maintenance of closets and domestic animals are complied with. Records consist of several books, including a record of proceedings and birth and death records. The death record is confused. Monthly reports are sent to the provincial board of health. The president of the municipal board of health, Señor José Imperial, is an intelligent and capable man, and is well known. This town is clean and can be considered in good sanitary condition. The common diseases are infantile convulsions, malaria, and tuberculosis. The cemetery is in good condition.

"*Olongapo.*—This town has no organized board of health, sanitary measures being adopted and enforced by the municipal board. Ordinances are in vogue relating to the hygiene of houses, cleaning of yards, streets, and squares, and also for the inspection of vessels. Inspections are made by the municipal president. The town is not provided with private closets, the same being prohibited. The municipal board has built three public latrines on the seashore. These latrines, besides being unsightly in appearance and in full view of steamers anchoring near said place, infect the waters along the beach, thereby preventing people from bathing in the surf. In my opinion this system should be discontinued and a system of dry-earth closets established.

"Records consist of three books—record of proceedings and birth and death records. Monthly reports are sent to the provincial board of health. Common diseases of the local-

ity are tuberculosis, malaria, and infantile convulsions. Some distance from the town a cemetery is situated, and is in good sanitary condition.

"The death records are imperfectly kept, and for this reason it was impossible for me to obtain accurate statistics.

"CHOLERA EPIDEMIC.

"Cholera made its appearance in this province (Zambales) during the month of July, 1902, spreading over the whole province, and disappearing completely in October of the same year. The next year, 1903, a few cases were again observed, in the town of Iba only. Generally it may be stated that the cholera was more deadly among the poorest classes of people. Each town enforced the regulations passed by the provincial board of health referring to the isolation of the sick and to maritime and land quarantine. Communication from one town to another was restricted. The municipal board bought medicines to give free of charge to the poor people. Special attention was given to the inspection of provisions and drinking water.

"CUSTOMS AND HABITS OF THE PEOPLE.

"The inhabitants of this province understand very little of hygiene. The wealthy people generally live neatly, but the poor, specially the Ilocano laborers living in the town, live under very unfavorable conditions. I observed that the only thing to which they give attention is the drinking water. I observed also that opium smoking is a common practice, the people believing that it cures disease. They are not in the habit of calling a physician when they are ill, but generally call a mediquillo, who treats them with some medicinal plant that they take with great faith. The lower class of people live upon a diet containing very little nutriment; hence they are very easy victims to disease.

"Malaria is the principal cause of death in this province. Every year, from November to February, the time of rice collection and the cutting of wood up in the mountains, it makes its appearance in different forms. In this connection I wish to suggest that because of the impoverished condition of the province, and taking into consideration the victims of malaria, proper medicines be given to the various health boards for free distribution. Rinderpest has caused great loss of cattle in this province. Carabaos and cattle died of rinderpest and horses of surra and rinderpest. At present these diseases seem to have disappeared, although in Iba some cases of rinderpest were observed among the carabaos. There are ordinances in reference to diseased animals, and the provisions in refereence to isolation are enforced.

"The number of lepers is perhaps not more than 60. They should be isolated instead of being scattered throughout the province, as they are at present."

NOTE.—Health Bulletin No. 3, on the Care of Infants, by a committee of native physicians, was submitted with the report, but is omitted for the sake of brevity.

APPENDIX B.

ANNUAL REPORT OF THE BOARD OF MEDICAL EXAMINERS.

OFFICE OF THE BOARD OF MEDICAL EXAMINERS,
Manila, P. I., June 30, 1904.

SIR: In accordance with section 4 of Act 310, regulating the practice of medicine and surgery in the Philippine Islands, I have been directed by the board of medical examiners to submit the following report for the fiscal year ending June 30, 1904:

There are four forms of certificates of registration issued by the board to persons who have been examined and favorably passed upon—one for persons holding the degree of doctor of medicine, another for persons holding the degree of licentiate of medicine, a third for undergraduates in medicine or 'cirujanos ministrantes," and a fourth for midwives.

During the year there were issued 28 certificates of the first class, 22 of the second class, 22 of the third class, and 3 of the fourth class, as shown by the following tabulated statement of monthly registrations:

Month and year.	Doctors of medicine.	Licentiates of medicine.	Cirujanos ministrantes.	Midwives.
1903.				
July	2		1	
August	6			1
September		1	1	
October	5	3	8	
November	1	3		
December	1	2		1
1904.				
January		1	1	
February	5	6	2	
March	3		8	
April	1	2		
May		4		1
June	4		1	
Total	28	22	22	3

Fifteen doctors of medicine, 14 licentiates of medicine, 14 cirujanos ministrantes, and 1 midwife were admitted to practice by examination, and 13 doctors of medicine, 8 cirujanos ministrantes, and 2 midwives were admitted by reason of having been qualified practitioners at the time of the enactment of the law regulating the practice of medicine and surgery.

RECEIPTS.

Examination of 15 doctors of medicine, at $15	$225.00
Examination of 14 licentiates of medicine, at $15	210.00
Examination of 14 cirujanos ministrantes, at $5	70.00
Examination of 1 midwife, at $5	5.00
Registration of 13 doctors of medicine, at $10	130.00
Registration of 8 licentiates of medicine, at $10	80.00
Registration of 8 cirujanos ministrantes, at $5	40.00
Registration of 2 midwives, at $5	10.00
Total	$770.00
Reduced to Philippine currency	₱1,540.00

This amount was paid in as $30 United States currency, ₱1,430 Philippines currency, and $58.25 local currency, all of which was deposited in the insular treasury.

EXPENDITURES.

The only expenses incurred by the board are the examination fees paid to Dr. Ariston Bautista, which are as follows:

First half year:	
Nine medical examinations, at $2.50	$22.50
Eight cirujanos ministrantes examined, at $1	8.00
Total	$30.50
Reduced to Philippine currency	₱61.00
Second half year:	
Twenty medical examinations, at $2.50	$50.00
Six cirujanos ministrantes examined, at $1	6.00
One midwife examined, at $1	1.00
Total	$57.00
Reduced to Philippine currency	₱114.00

There are 360 physicians, 131 cirujanos ministrantes, and 21 midwives registered in the archipelago; 217 or 60.27 per cent of the physicians, 46 or 35.11 per cent of the cirujanos ministrantes, and 19 or 90.47 per cent of the midwives reside in the city of Manila.

Figured upon 219,941 as the population of Manila, and 7,577,189 as the population of the Philippine Islands and excluding the cirujanos ministrantes who are practicing in remote towns, under a special provision of law, the ratio of physicians to the number of inhabitants in Manila is 1 to 1,013; outside of Manila it is 1 to 51,449, or an average of 1 to 21,047 for the entire population.

There are 101 army physicians practicing in the Philippine Islands who are not included in the above figures. These, if taken into account, would change the proportion to 1 physician to every 16,436 inhabitants.

The board has endeavored to give fair examination tests. The questions for physicians are submitted in writing and their answers are filed as part of the permanent records of the office; those for cirujanos ministrantes and for midwives are given orally by the president of the board, who certifies in writing to the board his finding for each applicant.

The following examination questions, used by the board during the year, may be taken as representative tests required of applicants for registration to practice medicine and surgery in the Philippine Islands.

ANATOMY AND PHYSIOLOGY.

1. Describe the antrum of Highmore.
2. Describe the hip joint.
3. Describe the male urethra.
4. Describe the inguinal canal.
5. Give origin, course, and distribution of the median nerve.
6. Describe briefly the pancreas and give the functions of this organ.
7. Name the different agents acting on food in the small intestines and state in what form such food is absorbed.
8. Name the gastric juices and state in what form food is absorbed after being acted upon by them.
9. What is chyle and how does it differ from lymph?
10. Describe the course of blood through the heart.

SURGERY AND SURGICAL PATHOLOGY.

1. What structures would be cut in amputating the leg at the junction of the upper and middle thirds?
2. Give pathology, symptoms, and treatment for intracranial hemorrhage due to rupture of the middle meningeal artery.
3. Give etiology, symptoms, diagnosis, and treatment of Pott's disease.
4. Classify dislocations of hip joint.
5. Classify different forms of aneurism and give different methods of treatment.
6. Give an operation for radical cure of inguinal hernia.
7. Define (*a*) ulcer, (*b*) abscess, (*c*) fistula, (*d*) sinus.
8. Classify wounds and give an example of each.
9. Describe the operation of lateral perioneal lithotomy.
10. Define shock and give symptoms and treatment of the same.

CHEMISTRY, MATERIA MEDICA, AND THERAPEUTICS.

1. Define (*a*) atom, (*b*) molecule, (*c*) element.
2. Convert 40° Centigrade to an equivalent number of degrees Fahrenheit.
3. Define (*a*) acid, (*b*) base, (*c*) salt.
4. Name the elements of the halogen group.
5. Define (*a*) mydriatics, (*b*) myotics, (*c*) alteratives, (*d*) styptics, and give examples of each.
6. Name the preparations of iron used in medicine.
7. Give the physiological and chemical antidotes for (*a*) opium, (*b*) strychnine, (*c*) corrosive sublimate.
8. Give the physiological action of (*a*) ether, (*b*) chloroform.
9. Give the preparations of mercury used in medicine, with doses of each.
10. Describe a method of testing urine for (*a*) sugar, (*b*) albumen.

BACTERIOLOGY, HYGIENE, AND LEGAL MEDICINE.

1. Name the principal pus organisms.
2. Name the organisms causing the following diseases and describe any one of them (*a*) typhoid fever, (*b*) malarial fever, (*c*) plague, (*d*) Malta fever, (*e*) Asiatic cholera.
3. Describe the different steps and the instrument necessary in making a leucocyte count.
4. Describe a system of plumbing for a modern dwelling house.
5. Describe a ventilation system for a hospital.
6. What is the quarantine period for (*a*) smallpox, (*b*) scarlet fever, (*c*) Asiatic cholera, (*d*) plague, (*e*) diphtheria.
7. Give symptoms, diagnosis, and treatment of strychnine poisoning.
8. Give differential diagnosis between (*a*) opium poisoning and acute alcoholism, (*b*) opium poisoning and apoplexy.
9. Give principal signs of deaths from drowning.
10. Define (*a*) idiocy, (*b*) dementia, (*c*) cretinism, (*d*) paranoia, (*e*) delusion, (*f*) illusion, (*g*) imbecility.

GENERAL PATHOLOGY, THEORY AND PRACTICE OF MEDICINE, AND DISEASES OF THE EYE AND EAR.

1. Classify tumors.
2. Describe the changes that take place in the repair of bone after fracture.
3. Describe the microscopic diagnosis between carcinoma and sarcoma.

4. Describe a carbuncle.
5. Give etiology, symptoms, and treatment of beri-beri.
6. Give symptoms, diagnosis, and treatment of heat stroke.
7. Give diagnosis and treatment of amœbic dysentery.
8. Give symptoms, diagnosis, and treatment of smallpox.
9. Give differential diagnosis of aortic regurgitation.
10. Give (*a*) causes, symptoms, and treatment of inflammatory glaucoma, (*b*) causes, symptoms, and treatment of a mastoid abscess.

OBSTETRICS, GYNECOLOGY, AND DISEASES OF CHILDREN.

1. Describe an operation for the restoration of the female perineum after a complete laceration.
2. Give treatment of gonorrheal vaginitis.
3. What are the symptoms and treatment of extra uterine pregnancy.
4. Give treatment of post-partem hemorrhage.
5. Give positive signs of pregnancy.
6. Give varieties, diagnosis, and treatment of placenta prævia.
7. Give cause, symptoms, and treatment of infantile convulsions.
8. Describe briefly the process of the eruption of the temporary teeth.
9. Give the diagnosis and treatment of cholera infatum.
10. Give causes, symptoms, and treatment of rickets.

Native and Spanish physicians manifest a spirit of respect for the medical law which is worthy of emulation by the Americans. They are careful in the preparation of their papers, and recognize the importance of reviewing the subjects upon which they are to be examined before presenting themselves before the board.

The commissioner of public health has kindly aided the board of medical examiners in many ways, for which due acknowledgment is here made.

Very respectfully,

R. E. L. NEWBERNE,
Secretary-Treasurer Board of Medical Examiners.

The SECRETARY OF THE INTERIOR.
(Through the Commissioner of Public Health.)

APPENDIX C.

REPORT OF THE BOARD OF PHARMACEUTICAL EXAMINERS.

MANILA, *July 13, 1904.*

Hon. DEAN C. WORCESTER,
Secretary of the Interior.

SIR: In accordance with section 6, Act 595, the board of pharmaceutical examiners begs to submit their annual report.

The present board, consisting of Enrique Perez, Manuel Zamora, and A. A. B. Schmerker, dates only from April 16 of the present year, holding its first meeting April 27, electing Enrique Perez president and A. A. B. Schmerker secretary-treasurer.

During the past fiscal year there have been registered: Registered pharmacists, 48; practicantes, 22; apprentices, 66; Chinese druggists, 24. There have also been 13 applicants for the examination of July 5, 1904.

The receipts from April 16 to June 30, 1904, were ₱292, of which ₱192 have been deposited with the insular treasurer, leaving a balance in the hands of the secretary-treasurer of ₱100.

There being no records of the receipts of the former board, we are unable to submit any report of the same.

Very respectfully,

ENRIQUE PEREZ,
President.
M. ZAMORA,
Member.
A. A. B. SCHMERKER,
Secretary-Treasurer.

APPENDIX D.

REPORT OF THE BOARD OF DENTAL EXAMINERS.

MANILA, P. I., *July 25, 1904.*

DEAR SIR: The board of dental examiners of the Philippine Islands, in compliance with section 5 of article 593 of the United States Philippine Commission, entitled "An act to regulate the practice of dentistry in the Philippine Islands," submits, as the second annual report of its proceedings, together with accounts of moneys received, the following:

The board has held during the past year 2 regular and 16 special meetings, at which such business was transacted as properly came before it.

Three applicants were examined and passed during the year. Of these one was a graduate of a college of recognized standing and the remaining 2 were "cirujanos ministrantes." The board at present has 5 applications for examination for admission to practice. One is from a graduate in dentistry, presenting a dental college diploma, while 4 of the applicants bring credentials from the Santo Tomas University of Manila.

During the year, through the courtesy of the medical inspectors' division of the board of health, inspections have been made of the different dental offices in Manila, for the purpose of verifying certificates displayed, looking over sanitary arrangements, and enforcing strict compliance with the regulations provided in Act 593. The part of the report dealing with the equipment, care of instruments, and sanitary conditions is very gratifying, there being an evident desire to keep things clean.

Some unimportant infractions of the law were noted and corrected by the offending parties upon their attention being directed to the same by the board. Several more important offenses have been reported and are now under investigation, but have not progressed far enough for a report.

A vacancy in the board was caused by the resignation, on April 1, 1904, of Dr. W. G. Skidmore. Dr. A. P. Preston was appointed to this vacancy by the commissioner of public health, and the appointment was later confirmed by the board of health.

The sum of ₱820 has been deposited with the treasurer of the Philippine Islands, which amount represents the total collections of the board during the year, from the following sources:

37 certificates of registration, at ₱20	₱740.00
2 certificates of registration, at ₱10	20.00
4 deposits for examination, at ₱10	40.00
1 deposit for examination, at ₱20	20.00
Total	820.00

Attached we respectfully submit a list of registered dentists in the Philippine Islands. The records of the board show that 37 have received certificates of regsitration to practice dentistry in the Philippine Islands. Two undergraduates are also registered, as provided in Act 593. These 39 are as follows:

Americans	9
United States Army surgeons	9
United States Marine-Hospital surgeons	1
English	1
Spanish and Filipinos	17
Filipino undergraduates	2
Total	39

Of the 9 American dentists registered only 5 are actively engaged in the practice of dentistry at present—3 in Manila, 1 in Iloilo, and 1 in Iligan.

The 9 dental surgeons of the United States Army are distributed through the different military posts of the archipelago. The remaining 19 are Spanish and Filipinos. Of this number 15 are located in Manila while 4 are in towns of the island of Luzon.

Outside of Manila and a few important towns the people are unable to secure the services of a dentist.

By order of the board:

A. P. PRESTON,
Secretary and Treasurer, Board of Dental Examiners.

Hon. DEAN C. WORCESTER,
Secretary of the Interior, Manila, P. I.
(Through the Commissioner of Public Health.)

List of registered dentists.—W. G. Skidmore, Louis Ottofy, A. P. Preston, E. B. Merchant, G. A. Marshall, R. E. L. Newberne, and G. L. Mitchell, Manila, P. I.; W. R. Martin, Iloilo, P. I.; J. D. Weldon, Iligan, P. I.; T. H. Stevens, Manila, P. I.; Robert T. Oliver, F. H. Wolven, W. H. Ware, E. J. Craig, C. E. Lauderdale, J. C. Whinnery, S. D. Boak, G. H. Cassady, and C. J. Long, U. S. Army; J. W. Strong, U. S. Naval Hospital; A. V. Dios, F. S. y Lopez de Arbizu, J. V. y Lachina, R. A. y Bautista, F. de G. y Bautista, L. R. y Carson, and A. F. y Ferrer, Manila, P. I.; F. A. y Benafé, Bangued, Abra, P. I.; C. L. y Garcia, Bonifacio Arevalo, Manuel Farinas, Sa. Da. C. y V. de Farinas, C. A. Asunción, and A. F. y Oliveros, Manila, P. I.; Regino Arevalo, Angeles, P. I.; Juan Arevalo and C. M. Arandes, Manila, P. I.
Undergraduates.—Feliz Callijo y Urbina, Albay, P. I.; Apolinar Madaniba, Laoag, P. I.

APPENDIX E.

REPORT OF CHIEF QUARANTINE OFFICER FOR THE PHILIPPINE ISLANDS FOR THE YEAR ENDED AUGUST 31, 1904.

PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE,
OFFICE OF THE CHIEF QUARANTINE OFFICER
FOR THE PHILIPPINE ISLANDS,
Manila, September 10, 1904.

SIR: In accordance with the request contained in your letter of July 12, 1904, I have the honor to make the following report of the transactions of the service in the Philippine Islands for the year ended August 31, 1904.

The past year has been one of heavy responsibility for the officer in charge of quarantine matters in the Philippines. There has been no time to speculate and theorize upon what might or what might not be, but actual danger had to be anticipated and avoided. The islands have been practically surrounded by countries in which quarantinable diseases were either prevalent in epidemic or endemic form, and with which constant communication has been maintained by swift vessels. The port of Hongkong, at which plague has been constantly present for many years, and which in more recent times has been visited yearly by cholera, is only two days' steaming distance from this port. Vessels arrive from there almost daily. Owing to the fact that most of the food stuffs and other supplies must be regularly imported into the Philippines, one of the first requisites of any quarantine measure must be that communication can be carried on without placing such restrictions upon commerce as to make it prohibitive. The business of the islands is largely maritime, and any incumbrance placed upon it is severely felt throughout the islands. It is therefore very satisfactory to be able to report that the Philippines have been successfully protected during the year from the entrance of quarantinable diseases, and at the same time there has been practically no interference with shipping. Instead of being a hindrance to commerce, the enforcement of rational sanitary measures with regard to vessels has become so well recognized as being beneficial that objections are now rarely made, and in many instances the masters of vessels request them. The sanitary work done in the Philippine Islands has been favorably commented upon throughout the civilized world, and so well is its efficiency regarded that a vessel that holds a good-health certificate from the Philippine Islands is now granted unconditional pratique in nearly all the ports of the

world. Japan has lately granted the same privileges to vessels that come from the Philippine quarantine stations as though they had passed through the Japanese quarantine.

This change in the attitude of other countries toward vessels from the Philippines is very gratifying and can not help but be of great benefit to Philippine commerce.

During the year cholera has occurred to the west of us in the principal ports along the entire eastern coast of Asia from Japan to the Straits Settlements. Plague has prevailed in epidemic form to the north of us in Formosa, and in Australia to the south of us. It shows a distinct advance in sanitary science that business has been carried on with these countries in an uninterrupted manner without a single case of quarantinable disease being imported into the Philippines. Actual results of this nature mean much to the islands in a commercial way, by demonstrating that people can live here with the same security from contracting quarantinable diseases as they would enjoy by residing in the United States.

A particularly fortunate feature of the sanitary situation has been that it has been possible to safeguard the islands against the importation of disease without interfering in an undue manner with commerce. The restrictions in force have all been of such nature that there has been very little delay to shipping or much expense involved in carrying them into effect.

In addition to the strictly professional duties, the chief quarantine officer has had charge of the quarantine appropriation, which amounted for the fiscal year to $117,500 United States currency. The economical administration of this fund required a great amount of painstaking labor. The responsibility of passing upon the necessity and legality of the expenditures and arriving at results that would be satisfactory to the reviewing power has been very great.

It is with much pleasure that I report that pleasant relations exist between the shipping interests, the army, the customs service, and the insular government in general.

PERSONNEL.

Passed Asst. Surg. Victor G. Heiser, chief quarantine officer for the Philippine Islands.

Manila: Passed Asst. Surg. Victor G. Heiser in command; Asst. Surgs. M. K. Gwyn, John D. Long, and R. H. Creel; pharmacists, N. C. Comfort and Chas. R. McBride.

Mariveles: Asst. Surgs. Chas. W. Vogel and H. M. Manning.

Iloilo: Asst. Surg. George W. McCoy.

Cebu: Asst. Surg. Carroll Fox.

Zamboanga: Temporary Acting Asst. Surg. R. U. Patterson.

Jolo: Temporary Acting Asst. Surg. William F. Lewis.

The work of the year has been very heavy and of a most trying character. Asst. Surg. H. A. Stansfield, who had already been in the islands for over three years, performing duty of the most arduous character, broke down completely from the strain. The effect of the continuous responsibility which the officers stationed at the outlying ports are compelled to bear, coupled with the fact that they are on duty every day, holidays and Sundays included, from daylight to sundown, without being relieved occasionally for even half a day,

which, added to the enervating influence of the climate, and difficulty of dealing with a population that speaks a foreign tongue, makes the detail in the Philippines a particularly trying one. It has been the endeavor, so far as practicable, to select officers in turn for the special details which arise from time to time, thus relieving them occasionally from the continuous boarding duty.

The service has cause for congratulation in the faithful and uncomplaining manner in which its officers and employees have performed their work in the Philippines, and all the more so when it is remembered that more vessels have been boarded and more disinfected than at all the national quarantine stations combined.

VESSELS BOARDED.

There were 3,882 vessels boarded at the port of Manila, and 7,783 at the other three ports of entry at which the service has officers stationed. Comparison shows that the number of vessels inspected is greater than in any other territory of equal size. An officer in the Philippines, therefore, in a few months has more actual quarantine experience than an officer on similar duty in the United States has in as many years.

VESSELS DISINFECTED.

One hundred and ninety-two vessels were disinfected. Of this number 156 were disinfected at the Manila station. Here again is an excellent illustration of the great amount of experience which an officer gains in this line of work in a very short time. Forty-one vessels were disinfected because cases of quarantinable diseases were found on board on their arrival in the Philippines. The balance were either disinfected because they came from infected ports, or at the request of the board of health on account of being infected with rinderpest or other cattle diseases.

VESSELS FUMIGATED.

Five hundred and fifty-seven vessels were fumigated with sulphur to kill rats and other vermin on board. Never before in the same length of time have so many vessels been treated by any quarantine service. The vessels ranged in size from the largest steamers that are found on the Pacific Ocean to the smallest sail vessel. It is impossible to estimate the amount of good that this fumigation has accomplished. In many cases it must undoubtedly have prevented the transmission of disease, to say nothing of the great amount of actual comfort that has been afforded the traveling public and the crews. Vermin naturally propagates much more abundantly in tropical climates than in temperate ones. This is especially true on board vessels, and unless means are taken to exterminate it from time to time the amount of vermin is only limited by the obtainable food supply. The discomfort which is caused by bedbugs, roaches, etc., can well be imagined. That vermin is largely concerned in the transmission of disease there is no longer any doubt. From the sanitarian's standpoint it is almost a fortunate thing that vermin is also a source of annoyance to the traveling public, because then his efforts to destroy it receive the hearty support of the shipping interests. Thus it has become possible to fumigate all vessels

without causing friction. The great importance of this fact will be appreciated when it is remembered that no permanent sanitary advancement can be made unless the measures have the support of the public.

In the fumigation of this large number of vessels the pot method was used almost entirely, because it was found much more satisfactory than the regulation sulphur furnace and many times more economical. The penetrability of sulphur gas generated in pots set in water is much greater than that generated in the sulphur furnace. It is not my purpose to enter into a technical discussion here of the relative merits of the two systems, but only to point out that the pot method has proven very successful, and that, owing to the simplicity of its operation, there is no reason why it can not be used at remote island ports and other places where it is not considered desirable to install more elaborate facilities. Excellent results are being reported by the Singapore quarantine authorities with the use of a new sulphur dioxid generator, the Clayton fire extinguishing and disinfecting machine. It seems that the original idea of the furnace was that it should be used as a fire extinguisher, and be a part of the permanent equipment of a vessel. Many vessels are now fitted with these furnaces, and use them for fumigating in order to destroy vermin. Such vessels often request that they be exempted from sulphur fumigation. In order that these requests may be considered intelligently, the machine has been brought to the attention of the Public Health and Marine-Hospital Service Bureau at Washington in order that it may be investigated and reported upon by an expert and the necessary tests made in the Service laboratory.

CHOLERA.

This year has seen what is generally believed to be the complete cessation of cholera throughout the islands. The last case was reported in Manila February 29, 1904. The last case reported in the provinces was on April 18, 1904.

During the fiscal year there were 600 cases, with 542 deaths reported in the city of Manila. Twenty-three thousand two hundred and thirty-three cases and 18,369 deaths were reported in the provinces. Thus has ended one of the most devasting epidemics, with the exception of the plague in India, which has afflicted man in recent times. If the estimate made by conservative observers be accepted that there was an additional case for each one reported, there were then in round numbers more than 300,000 cases. Actually over one-twentieth of the population was affected in a little over a year by this one disease alone, two-thirds of which was destroyed. Since we know that the disease is introduced into a community only by another case by water, or by certain food products, it will be seen that it is possible to prevent its reintroduction, but since communication is indispensable, it will also be apparent that the quarantine officer assumes a tremendous responsibility in attempting to regulate the shipping which arrives here from ports infected with cholera, and his task is practically impossible from the outset, unless he has the active cooperation and assistance of the United States officers stationed at the foreign ports, and also of the local officials. In connection with the recent outbreak of cholera on the eastern shore of China,

an interesting question has presented itself. Did cholera finally extinguish itself here because all the available material was used up, or because the organism had become so attenuated that it was no longer able to convey cholera to an individual? If the former was the case, there was not much danger to be apprehended in the Philippines by the outbreak of the disease in Hongkong and Saigon. If the latter was the case, the introduction of a case of cholera into the islands was of the gravest import. In the absence of definite information to the contrary, the latter was assumed to be the case, and those parts of the quarantine regulations which were applicable were enforced. An important fact brought out by the recent epidemic was that the incubation period was very rarely found to be more than forty-eight hours. With this in mind, when the cholera again made its appearance in Hongkong last May the following action was taken: In addition to the measures imposed upon vessels at Hongkong by the Service officer stationed there, vessels are required to call at Mariveles, where a thorough inspection is made, and any additional disinfection that is necessary is done. The inspection at Mariveles also affords an excellent opportunity to search for fresh vegetables and other prohibited articles that may have been taken aboard unauthorized. Upon the completion of the inspection, if everything is found satisfactory, the vessel proceeds to Manila without detention. It is believed that by this method of treating Hongkong vessels that the islands are as efficiently safeguarded against the invasion of cholera as by a five-days' quarantine, and the losses and annoyances to the shipping interests are reduced to a minimum. An administrative detail that has been of the greatest assistance in dealing with vessels from infected ports was the carrying into effect a regulation that nothing other than articles actually on the cargo manifest should be removed from the vessels while in the ports of the Philippines, unless written authority was obtained from the quarantine officer. By this method many suspected things were prevented from landing; especially was this true of ships' stores. The Customs Service has been of the greatest assistance to us in carrying this regulation into successful effect.

In the latter part of August the village of Mariveles (population about 1,000), at which is also located the Mariveles Quarantine Station, after enjoying entire freedom since the beginning of the epidemic, became infected. The labor supply for the station is drawn from the village, and it is therefore necessary to take all precautions to prevent the station from becoming infected, because this would seriously affect the efficiency of the quarantine station at a time when its uninterrupted operation was essential to the health of the entire islands.

The importance of this matter was appreciated by the insular health authorities and the Army. The Service cooperated with the foregoing officials, and in a few days the disease was under entire control, and by September 12 no further cases occurred. Total number of cases 12, with 5 deaths.

Investigation showed that the disease was not introduced into the village from the quarantine station. Coincident to the outbreak of the disease, the population of the village was augmented by the arrival of 300 stevedores who remained there permanently to coal the army transports. In the desire of the local merchants to cater

to the wants of this increased population, a supply of fresh vegetables and bottled waters was obtained from Manila, and with it, in all probability, the cholera. Cases were immediately isolated and the premises disinfected. The stevedores were placed in a camp by themselves, a rigid daily inspection made of all persons, and all suspicious cargo was refused landing. The water supply being above suspicion, these measures speedily accomplished the eradication of the disease. It was an excellent illustration of what may be accomplished by sanitary science when the proper means are at hand for its application. The maritime quarantine inspection at Mariveles of vessels from Manila was maintained until the cessation of the disease at Manila, and it was completely successful.

In the early part of September there was suddenly a decided increase in the number of cholera cases in Manila. For the week ended September 12, 1903, instead of the usual number of from 18 to 25 cases per week, there were 79 cases and 63 deaths reported. The increase was soon traced to some fresh water which bubbled up through the salt water of the bay at a point just off the Tondo district. The fact that fresh water could be dipped from a salt-water bay was regarded as a miracle by the natives, and they flocked there in large numbers to drink of and bathe in this water, to which wonderful curative properties were ascribed. Investigation showed that some pipes of a sewer which ran for some distance into the bay had become broken and that fresh water, therefore, came directly to the surface. On September 10 there were 8 cases reported; on September 11, 16, and on September 12, 30. Access to the spring was then prohibited by the authorities, and there was a rapid decline in the number of cases. Small sailing craft, called "paraos," which were anchored in the immediate vicinity of the spring, were required to undergo five days' quarantine detention at a remote place in the harbor before being permitted to sail. This was done with the view of preventing any of this water being carried to the provinces and to guard against the outbreak of the disease among the personnel of the vessels after leaving here. As the danger from this source was over in a few weeks, the quarantine was declared off. From that time on there was a general decline of cholera throughout the islands. This was in accord with the previous history of the disease, viz, that cholera in the Philippines never lasts beyond the third year.

PLAGUE.

The reduction in the number of plague cases over that of last year is probably one of the most satisfactory sanitary results that has been achieved during the year. The energetic application of modern sanitary principles has had its reward. During the fiscal year ended June 30, 1902, there were 121 cases reported, but there were probably many not reported. This year there were 101 cases. Briefly, the plan inaugurated was as follows: From carefully prepared statistics it was found that the Chinese were many times more liable to contract the disease than the Filipinos. Accordingly, the Chinese population of Manila was inoculated with Shiga's antipest serum. It was the aim to give a primary and, a month later, a secondary inoculation. The records of the board of health show that no Chinaman contracted plague who had received a secondary inoculation, and only a few

(3?) contracted the disease who had received the primary inoculation. The Chinese, then, instead of being the race most likely to contract the disease, became the one least likely to contract it. During the last six months the plague has been confined almost entirely to the Filipinos. Since the period during which the Chinese have been free from plague corresponds to the period during which they were first inoculated with serum, it would appear to be a fair inference that the result was due to the serum. Contacts are no longer quarantined. When an individual contracts plague he is immediately removed to the hospital and the contacts to the disinfecting station. The house from which he has been taken is disinfected, the contacts are similarly treated and then discharged. Rat catchers are immediately sent to the house and directed to catch not only the rats in the house, but also in the immediate neighborhood. When it is remembered that plague has prevailed with undiminished vigor in near-by foreign ports and that the climate and other conditions in Manila are favorable for its development, it will be seen that the situation is encouraging. From the foregoing it will be observed that it is highly important that no fresh cases be introduced from the outside, otherwise the work will all be rendered useless. In this connection it is pertinent to state that not a single case could be traced as having been introduced from a foreign country or to having contracted the infection from such source. This shows that the maritime quarantine has been efficient and that through it lies the only hope of permanently eradicating the disease from the islands.

Another important point for the quarantine officer is the fact that while cases have occurred in widely-separated provinces there was no spread from them. This would indicate that a case of plague in a human being is not so great a source of danger as the introduction of infected rats or cargo. The application of the latter principle has been used by the Service almost entirely in preventing the spread of the disease to other ports of the islands during the past four years.

For a number of years past there has been an occasional sporadic case at Cebu. The finding of a case is generally preceded by dead rats being found in the neighborhood. In September last 11 cases made their appearance within comparatively a few days and the disease then disappeared again almost completely before the measures instituted with the view of stamping it out can fairly be said to have been properly started. Since that time there has been an occasional case, averaging possibly one a month. The Service has been fumigating with sulphur all vessels that leave either Cebu or Manila for other island ports. It has been the aim to fumigate all vessels that ply between Hongkong or other plague-infected ports and Manila about twice a year, and especially after they have been in dry dock at Hongkong, during which process it is quite probable that rats come aboard. Since some of the dry docks are located in sections of the city that are plague-infected, the importance of this matter will be appreciated. In my opinion, one of the most important factors in the plague not easily gaining entrance here is the fact that there are no wharves and that foreign vessels always unload into lighters.

During the active plague season at Amoy (generally May, June, July, and August) the consular surgeon there was requested to detain all steerage passengers for the Philippines in quarantine for the incubation period of the disease.

SMALLPOX AND VACCINATION.

Smallpox continues to be the disease which the quarantine officer meets with most frequently on board vessels. During the year nine vessels were disinfected at Mariveles on account of smallpox and eight at the other ports of the islands. The Commission has passed an act making vaccination compulsory, and the board of health is at present engaged in carrying the act into effect. If the health authorities are furnished with a reasonable amount of funds there is no reason why the Philippines should not become as free from smallpox as Porto Rico. The Service commenced the systematic vaccination of crews last September. Up to the end of the fiscal year there had been 18,773 persons vaccinated at all the ports at which Service officers are stationed. Among the 11,399 vaccinated at Manila it is known that there were 6,502 "takes." There were probably many more, but as they did not come under observation the exact number is unknown. At Iloilo there were 3,358 persons vaccinated, with 1,266 known takes (estimated takes 2,670). At Cebu there were 4,036 persons vaccinated, with 590 known takes. The small number of takes at Cebu is explained by the fact that when persons from the nearby provinces wish to visit Cebu many of them ship as crew for the trip and thus receive a primary vaccination, but do not come under observation again because they do not come back with the vessel. At Jolo 420 persons were vaccinated; number of takes not reported. When it is remembered that many of these persons had been vaccinated before, it will be seen that the results were very satisfactory. At Manila the takes averaged over 50 per cent.

An administrative detail that was of great assistance from the standpoint of efficiency and as a timesaving device was the issuing of cards to all persons vaccinated. A red card, which, among other things, included the individual's name and the date of the vaccination, was used for the first vaccination; a white card for a second vaccination, and a blue card if the vaccination was successful. The cards were numbered consecutively. Starting with a definite number of cards, it therefore required only a few minutes' work to arrive at the number of vaccinations performed, and with what result. The greatest timesaving was effected, however, at the inspection. The crews were mustered. All holding blue cards were immediately dismissed. Thus there was no confusion, and the remaining ones were rapidly dealt with. After the work was well under way the various shipping firms were requested to employ only persons holding blue cards. This had an excellent effect, and acted as a direct stimulant for seafaring people to be vaccinated and obtain the blue cards in order that they might be eligible in this respect for such positions as they desired.

LEPROSY.

Cases of leprosy were detected on six vessels. Two other vessels had suspicious cases on board, but the diagnosis could not be bacteriologically confirmed.

AID TO OTHER SERVICES.

During the year there were 878 physical examinations made of masters, mates, pilots, and engineers, and other ships' officers at the

request of the insular collector of customs. Of this number 99 were rejected. For the immigration service 6,252 immigrants were inspected and 472 rejected.

Thirty vessels were disinfected at the request of the board of health on account of being infected with cholera, rinderpest, etc.

Special physical examinations were made at the request of the Philippine civil service board.

At the request of the Army, transports were inspected at Mariveles instead of at Manila at such times as they desired. The stevedores located at Mariveles were inspected daily for many weeks, and aid was rendered in establishing an isolation camp for them.

APPROPRIATION FOR A QUARANTINE STATION AT CEBU.

The Philippine Commission in Act No. 831, passed August 12,1903, appropriated $30,000 United States currency for the erection and equipment of a quarantine station at the port of Cebu. Steps were at once taken for the erection of the same. A board of officers composed of Passed Asst. Surg. Victor G. Heiser, Asst. Surgs. Carroll Fox and J. D. Long decided that the island of Cauit, situated in the harbor of Cebu, about a mile below the port, was its first choice for a location. A piece of land about 3 miles above Cebu, on Mactan Island, was its second choice. The island of Cauit was considered by far the most desirable site, and since it was in all probability government property it was thought best to make every effort to obtain it. When this intention became known at Cebu a claimant appeared. The case came up before the court of land registration and it was decided in favor of the government. The case has since been appealed to the court of first instance of Cebu, and it is still pending at this writing

APPROPRIATION FOR AN ADDITIONAL LAUNCH.

The Philippine Commission, recognizing the great need of another launch for use of the quarantine service at Manila, appropriated in Act No. 831, passed August 12, 1903, the sum of $4,000 United States currency for this purpose. Through the proper channels a contract was awarded to a San Francisco firm for building the same. Owing to the immense amount of work to be done a certain speed is absolutely essential, and owing to the weather conditions which prevail in Manila Bay it is necessary that a certain type of launch be adopted. The contractors failed to meet the specifications in both these respects, as well as in other essentials, and in consequence the contract was canceled. We are indebted to Passed Assistant Surgeon Cumming, of the San Francisco Quarantine Station, for acting as inspector of the vessel during its construction, and we desire to use this means to bear testimony of our appreciation of the courteous manner in which he performed his work. Negotiations are now under way for the purchase of a launch elsewhere.

INTERISLAND QUARANTINE.

The interisland quarantine inspection of vessels was in charge of the insular board of health for all ports other than ports of entry, and the Service has had control of the latter. Whenever an infected vessel was encountered by the board of health, if practicable, it was

remanded to the nearest quarantine station for treatment. Up to the beginning of the second half of the fiscal year quarantine inspection of incoming vessels had been general throughout the islands. In the latter part of February the cholera situation had improved so much that the insular board of health requested the opinion of this office as to whether it was considered necessary to continue it. The reply was made that it was considered advisable to discontinue all maritime quarantine inspections at other than ports of entry, unless some special local condition demanded it. It is thought that a rigid inspection should still be made at present at the ports of entry, not only of foreign vessels, but also of all interisland vessels for the purpose of keeping a surveillance over their sanitary condition. Since practically all local vessels sooner or later call at the ports of entry it is thought that a good check can be established by this method. There has been a great improvement in the sanitary condition of interisland vessels during the past year, but there is still much left to be desired. Inspection by experienced officers is considered necessary from time to time in order that the improvement which has been brought about may be maintained and other necessary ones instituted.

Every effort is made to inspect incoming vessels with promptness and dispatch. It is not believed that the sanitary condition of the islands is sufficiently grave to warrant an inspection that would interfere with the free movement of interisland vessels, and with that object in view the launch service has been so arranged that an incoming vessel can be inspected at any time of the day a few minutes after its arrival.

IMMIGRANT MEDICAL INSPECTION.

The first systematic and official medical inspection of immigrants began July 1, 1903, and was done at the request of the insular collector of customs who represents the United States Immigration Service in the Philippines. The immigrant medical inspection is made on the deck of the vessel immediately after the quarantine inspection is concluded. The climate is so mild that it is possible to do this, but it would be much more satisfactory if better facilities could be provided. All those who are passed by the medical officer then go before the immigration officer, and if passed by him they go ashore. All those immigrants who have not passed the medical inspection are then examined a second time in the presence of the medical officer in charge. For all those failing to pass this last examination the regulation certificate is issued, signed by the medical officer in charge and initialed by all the medical officers who have seen the case. The rejected immigrants are then turned over to the immigration authorities. By this method rejected immigrants are speedily returned to the port from whence they came, and they seldom ever have an opportunity to leave the vessel while it is in a port of the Philippines.

Immigrants are brought to Manila by 10 different steamship lines. A number of instances have already come under observation in which an immigrant would be deported on one line and return several times subsequently on other lines, only to be again deported.

The great majority of immigrants arrive by the trans-Pacific steamers, which make Japanese ports a place of call while en route to Manila.

The total number of immigrants inspected during the year was 6,252. Total number of rejections for medical causes, 472. The

total number of persons ordered deported on account of being medically rejected, 468. Percentage of rejections, $7\frac{9}{16}$ per cent.

Several facts which differ entirely from the experience at other stations are shown by the foregoing figures. First, the number of rejections for medical causes is exceedingly high when it is considered that all aliens not likely to be permitted to land in the Philippines are already supposed to have been advised not to embark by the service officers stationed at ports from which the immigrants come. Second, the number of immigrants ordered deported for medical cause closely corresponds to the number of medical certificates issued. This shows that the diseases for which the immigrants are rejected in all probability belong to one of the absolutely excludable classes. On examination of the medical report it will be seen that this observation is borne out by the fact that nearly all the rejections have been made on account of trachoma. At first sight it might seem that in the examination of 6,252 immigrants that many other more or less grave physical defects should have been detected. But when it is remembered that with the exception of an insignificant few the entire immigration that comes to the Philippines is Japanese, that they are nearly all male adults in the prime of life, and that this race of people is noted for their sound physique, the matter assumes a new aspect. Another important consideration is the fact that the tide of immigration to the Philippines has only begun, and the history of all peoples shows that when immigration to another country begins that at first only the more hardy members immigrate. After they establish themselves the weaker ones follow.

The circular letters, the statistics, the reports from the substations, and the financial statement follow:

[Circular letter.]

OFFICE CHIEF QUARANTINE OFFICER FOR THE PHILIPPINE ISLANDS,
Manila, P. I., September 26, 1903.

SIR: Owing to the continued presence of smallpox throughout the islands, and to reduce the possibility of the infection being conveyed by ships, it has been decided to vaccinate the crews and foreign steerage passengers of vessels which enter the ports under the control of this Service.

In order to facilitate the work, and that the records of the same may be of value, a number of cards have been printed, a supply being sent you herewith.

Upon vaccinating a member of a crew you are directed to hand the person a red card properly filled out. The next time this individual comes under observation, you will examine the vaccination, and if it has been successful you will destroy the red card and supply a blue one instead. The presentation of this latter card will exempt the individual from further vaccination. Whenever a red card is presented, and there is no evidence of a successful vaccination, the person presenting the same should be revaccinated, the red card destroyed, and a white one supplied. An individual who presents a white card and shows evidence of having been twice vaccinated by you, whether successfully or not, should have the white card destroyed and a blue one supplied.

Practical experience has shown that if the matter is properly explained to the shipping interests, that in hiring crews they will always give preference to a person with a blue card, because he is much safer from a sanitary standpoint. Sailors and others who follow a seafaring life soon learn this and are anxious to obtain blue cards, and once having obtained them they preserve them.

An accurate record should be kept of the number of vaccinations done, the number successful on the first vaccination, the number successful on revaccination, and the number unsuccessfully vaccinated after two trials.

Respectfully,

VICTOR G. HEISER,
Passed Assistant Surgeon, Chief Quarantine Officer for the Philippine Islands.

MEDICAL OFFICER IN COMMAND,
UNITED STATES PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

[Circular letter.]

OFFICE CHIEF QUARANTINE OFFICER FOR THE PHILIPPINE ISLANDS,
Manila, P. I., November 12, 1903.

SIR: In order to make the vaccination of crews still more efficient, the following additions are made to the circular letter of September 26, 1903:

When a white card is presented, and on inspection it is found that the individual was twice unsuccessfully vaccinated, he should be revaccinated and the white card marked with an "X." When a white card with an "X" is presented, and when it is found that the individual was three times unsuccessfully vaccinated, he should be given a blue card, which, in addition to the other data, should have the figure 3 written upon it. When persons with the latter card are found at future inspections, it will indicate to the inspector that the individual was vaccinated three times unsuccessfully and that further attempts would probably be useless.

Respectfully,

VICTOR G. HEISER,
Passed Assistant Surgeon, Chief Quarantine Officer for the Philippine Islands.

MEDICAL OFFICER IN COMMAND,
UNITED STATES PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

[Circular letter.]

OFFICE CHIEF QUARANTINE OFFICER FOR THE PHILIPPINE ISLANDS,
Manila, P. I., December 28, 1903.

SIR: You are hereby advised that the disbursing officer of the Service has informed this office that on and after January 1, 1904, the use of the Government salary table in the payment of the salaries of officers of the quarantine service will be discontinued. All payments will be made in accordance with the rules promulgated by Executive order of the President, relative to an accounting system for the government of the Philippine Islands, which prescribes that the monthly salary shall be one-twelfth of the annual salary and that an official month is thirty days. For example, a salary of $1,600 per annum will consequently have to be paid by disbursing officers at the monthly rate of $133.33 United States currency, or 266.67 Philippine pesos.

In the future your pay rolls should be made out on the aforesaid basis.

Respectfully,

VICTOR G. HEISER,
Passed Assistant Surgeon, Chief Quarantine Officer for the Philippine Islands.

MEDICAL OFFICER IN COMMAND,
UNITED STATES PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

[Circular letter.]

OFFICE CHIEF QUARANTINE OFFICER FOR THE PHILIPPINE ISLANDS,
Manila, P. I., January 8, 1904.

To Shipowners, Shippers, Agents, Masters of Vessels, and Others Concerned, Manila, P. I.

SIR: In order that the requirements of the United States Quarantine Laws and Regulations in force in this port with regard to vessels and their passengers, crew, and cargo may be better understood, the following regulations are hereby promulgated. Nothing in these rules, however, whether by omission or otherwise, is to be construed as exempting a vessel from complying with the United States Quarantine Laws and Regulations.

INCOMING VESSELS.

1. All vessels entering from ports outside of Manila Bay shall fly a yellow flag at the foremast head until boarded and granted pratique by the quarantine officer.

2. Until vessels have been granted pratique, no person or vessel shall be allowed to come close enough to hold communication. Masters of incoming vessels will be held to strict accountability for the enforcement of this rule.

3. All cases of sickness of a contagious nature, or deaths due to any cause while vessels are lying in port, should be reported immediately to the quarantine office, or the quarantine

officer on duty on the bay may be notified by hoisting the letter "D" of the International Code of Signals.

4. Vessels entering the ports of the Philippines are required to be mechanically clean and kept in good sanitary condition. Special attention should be given to the forecastles, galleys, toilets, baths, and living apartments.

5. In the event of any incoming vessel having sickness of any kind on board, it is recommended that she call at Mariveles for inspection. If the disease is not of a quarantinable nature the vessel will be released at once and allowed to proceed to Manila and there granted pratique in the ordinary way. This suggestion is made with the view of avoiding the delay caused by the ship returning to Mariveles in the event of such disease being of a quarantinable nature.

6. All vessels arriving from infected ports, the ordinary running distance from which is not over seven days from Manila, or vessels whose crew and steerage passengers have not been disinfected at the port of departure, will be required to call at Mariveles for disinfection.

7. The cargo manifests of all vessels sailing from foreign ports to the Philippines should be submitted to the medical officer on duty at the United States consulate at the port of departure for signature.

8. Rabbits, dogs, guinea pigs, cats, and small animals in general from infected ports can not be landed, and all such animals, regardless of the port of origin, require a permit from this office prior to being landed.

9. Ship's stores and all other articles not on the manifest are not to be landed unless a permit has first been obtained from this office.

10. The quarantine anchorage, for the purpose of these regulations, is Manila Bay.

OUTGOING VESSELS.

(Includes only vessels bound for the United States or its dependencies.)

1. As soon as it has been determined to dispatch a vessel to a United States port, or to a port in its dependencies, this office should be immediately notified.

2. Masters of vessels departing from this port must obtain a bill of health in duplicate, signed by the medical officer of the United States Public Health and Marine-Hospital Service. The applicant for the bill of health must be able to supply the following data: Name of vessel, nationality, rig, name of master, tonnage (gross), tonnage (net), iron or wood, number of compartments for cargo, compartments for crew, compartments for steerage passengers, name of medical officer, number of ship's officers, number of crew (including petty officers), number of cabin passengers, number of steerage passengers, number of crew or passengers landed at this port, number of crew or passengers embarked at this port, total number of persons on board, port of departure, where last from, destination, source of water and food supplies, number of cases of sickness and character of same during last voyage, number of cases of sickness and character of same while vessel was in port. Before such bill of health can be issued the following rules must be complied with:

3. Before loading is begun vessels will be subject to inspection, and upon its completion the master will be informed as to what sanitary measures are deemed necessary and the probable time required to carry them into effect.

4. As early as possible the cargo manifests should be presented at this office for examination. If it be not practicable to present manifests, boat notes or bills of lading should be presented instead. In every case, before cargo, stores, or other articles are taken aboard, the consent of this office should first be obtained; otherwise suspected cargo might have to be unloaded and the vessel disinfected.

5. All persons, including crew and passengers, and their effects taken on at this port are subject to inspection before embarkation. The effects of cabin passengers should be assembled at least twelve hours prior to embarkation; those of crew or steerage passengers at least twenty-four hours previously. This timely inspection is necessary in order that there may be no delay caused to the vessel in the event of disinfection being deemed necessary.

6. All baggage and other goods not on the ship's manifest must be labeled before being placed on board. All unlabeled baggage found on board at the time of the final inspection will have to be removed from the vessel.

7. After the final inspection, which is made by the quarantine officer on board, no further communication with shore or with other vessels in the harbor can be allowed.

VICTOR G. HEISER,
Passed Assistant Surgeon, Public Health and Marine-Hospital Service,
Chief Quarantine Officer for the Philippine Islands.

Statistics of quarantine transactions at the port of Manila, P. I., for the year ended August 31, 1904.

INCOMING.

Month.	Vessels inspected from—		Vessels in quarantine.	Vessels disinfected.	Bills of health issued.	Pieces of baggage disinfected.	Pieces of baggage inspected and passed.
	Foreign ports.	Domestic ports.					
1903.							
September	69	277	5	34	341	3,267	746
October	69	280	2	31	349	3,718	495
November	67	263		49	316	2,621	324
December	59	249		18	313	2,463	221
1904.							
January	45	256		55	295	858	122
February	49	270	1	22	333	252	53
March	58	356		34	422	1,961	219
April	57	343	2	38	400	2,339	861
May	58	314	7	49	369	4,688	377
June	55	225	3	22	322	492	26
July	49	174	2	18	253	722	52
August	52	188		27	225	163	43
Total	687	3,195	22	400	3,938	23,544	3,539

Month.	Crew inspected.	Passengers inspected.		Persons vaccinated.		Persons bathed and effects disinfected.	Persons quarantined (suspects).
		Cabin.	Steerage.	Crew.	Passengers.		
1903.							
September	11,889	1,495	5,820	1,467	24	1,908	196
October	12,096	1,758	6,484	2,342	195	2,440	221
November	11,484	1,682	7,554	1,291		2,850	
December	11,566	1,895	6,883	1,571		1,724	
1904.							
January	10,029	1,330	4,996	1,367		747	
February	10,340	1,212	5,775	1,433		234	91
March	12,272	1,743	7,720	1,268		872	
April	12,651	1,709	7,734	1,306	48	1,362	78
May	11,554	1,671	6,721	1,004		719	295
June	9,679	1,638	6,509	943	3	239	60
July	9,271	1,325	4,101	603	80	390	97
August	9,421	1,190	4,014	434	59	167	
Total	132,252	18,648	74,311	15,089	409	13,642	1,038

OUTGOING.

Month.	Vessels inspected.	Vessels in quarantine.	Vessels disinfected.	Vessels remanded to Mariveles.	Pieces of baggage disinfected.	Pieces of baggage inspected and passed.
1903.						
September	15	11	4		152	982
October	7		5		1,433	1,430
November	6		5		1,812	1,182
December	8		7		2,386	2,274
1904.						
January	6		4		2,726	2,467
February	6		1		3,746	2,952
March	4		3		4,335	2,616
April	4		2		3,050	3,641
May	7		4		3,050	2,620
June	8		7		2,464	3,807
July	6		4		1,862	1,167
August	8		8		947	1,846
Total	85	11	54		27,972	26,993

Outgoing quarantine transactions at the port of Manila, P. I., for the year ended August 31, 1904.

Month.	Crew inspected.	Crew quarantined.	Passengers inspected.	Steerage passengers quarantined.	Persons vaccinated.	Persons bathed and clothing disinfected.
1903.						
September	493	81	1,333	27		1,239
October	543		1,121			1,107
November	507		998			867
December	572		1,338			1,356
1904.						
January	383		1,244			1,263
February	330		1,844			1,943
March	501		1,827			1,665
April	368		1,229			1,275
May	791		645			1,092
June	423		990			958
July	395		495			482
August	412		507		24	568
Total	5,718	81	13,571	27	24	13,755

Inspection of aliens at the port of Manila, P. I., during the year ended August 31, 1904.

Month.	Number inspected.	Number certified.	Number deported.	Cause of deportation.
1903.				
September	190			
October	694	7	7	1 heart disease, valvular aortic; 6 trachoma; 1 heart disease, organic; 35 trachoma.
November	694	48	48	12 trachoma (?).
December	498	46	46	46 trachoma.
1904.				
January	237	41	41	31 trachoma; 10 trachoma (?).
February	270	29	29	29 trachoma.
March	1,308	38	38	38 trachoma.
April	290	32	32	31 trachoma; 1 syphilis.
May	291	27	25	25 trachoma.
June	533	77	77	77 trachoma.
July	392	82	82	82 trachoma.
August	351	37	37	36 trachoma; 1 valvular disease heart (mitral).
Total	5,748	464	462	

OFFICE OF THE UNITED STATES QUARANTINE OFFICER,
Iloilo, P. I., September 1, 1904.

SIR: I have the honor to render the following report of quarantine transactions at this port for the year ended August 31, 1904:

The station was in charge of Asst. Surg. M. K. Gwyn until August 3, 1903. From September 13 to October 23, 1903, it was in charge of Asst. Surg. J. W. Amesse. During the remainder of the year it has been in charge of Asst. Surg. George W. McCoy.

A number of vessels arrived with cholera and smallpox on board, and have in all cases been treated as nearly in accordance with the regulations as our facilities would permit.

One vessel arrived with a case of leprosy. As the victim was a native of Iloilo, the case was turned over to the local board of health. The vessel was disinfected by this Service.

A number of vessels have been held from a few hours to a day for the purpose of making a diagnosis in cases that presented a doubtful eruption or fever, the cause of which was not at once apparent.

Crews of all interisland vessels coming here have been vaccinated from time to time.

At intervals of a few months local vessels have been fumigated for the purpose of destroying vermin. Foreign vessels have been fumigated whenever they were empty. Experience has taught us that it is almost a waste of time to fumigate a vessel with cargo.

The only class of vessels with which we have had any difficulty are the small boats known as bancas and paraos. They sometimes enter the port at night, crews going ashore claiming ignorance of quarantine regulations. They are then required to collect their crews, proceed to the bay and await inspection, but one can not be certain that he is seeing the people who arrived on the vessel.

During the year cholera is the only quarantinable disease, aside from leprosy, that has prevailed at this port. Accurate figures were difficult to obtain, but at no time did the death rate exceed 20 per day. Practically no measures were taken to limit its spread, and it simply died out by the operation of natural causes. It was rather discouraging at a time when we were holding infected vessels in strict quarantine to know that cases were occurring in the city, and not even the simplest precautions taken to prevent the spread of the disease. Indeed, on one occasion the office messenger asked for half a day's leave of absence to attend the funeral of his father and mother, who had, he said, died of cholera the previous night. Investigation showed that he had given a truthful reason for making the request. While the cholera prevailed in the port a rigid outgoing quarantine was maintained.

During the prevalence of cholera on the island of Negros vessels coming from there were inspected, even though they were but two or three hours on the voyage.

The inclosed circular letter shows what special precautions have been taken in dealing with vessels from plague-infected ports while they were in port.

There have been a number of violations of quarantine regulations. They have usually been punished by a fine imposed by the collector of customs.

Arriving aliens have been inspected for immigration purposes. There have been several rejections for trachoma, and conditions rendering persons liable to become public charges. It is to be regretted that there are no hospital facilities where doubtful cases can be placed for observation.

Throughout the year cordial relations have been maintained with both the civil and military authorities, and shipping people have very generally complied with all regulations.

Respectfully,

GEORGE W. McCOY,
Assistant Surgeon.

The CHIEF QUARANTINE OFFICER FOR THE PHILIPPINE ISLANDS.

IV.

[Circular letter.]

Regulations governing vessels from plague ports.

OFFICE OF THE UNITED STATES QUARANTINE OFFICER,
Iloilo, P. I., May 16, 1904.

Owners and agents of vessels, Iloilo, P. I.

SIRS: In future all vessels from ports infected or suspected of being infected with plague will be required to have all lines and cables connecting the vessels and the shore guarded by rat funnels while moored in the Iloilo River.

This includes vessels from practically all foreign ports and Manila and Cebu in the Philippines.

Between sunset and sunrise all planks to the shore shall be taken up, and lighters or other vessels will not be permitted to remain alongside the vessels above indicated at night.

Vessels failing to comply with these regulations will not be permitted to remain in the river.

Respectfully,

GEORGE W. McCOY,
Assistant Surgeon, Public Health and Marine-Hospital Service,
Quarantine Officer.

Copy furnished.

_____,
Iloilo, P. I.

Statistics of quarantine transactions at the port of Iloilo, P. I., for the year ended August 31, 1904.

INCOMING.

Month.	Vessels inspected from—		Vessels in quarantine.	Vessels disinfected.	Bills of health issued.
	Foreign ports.	Domestic ports.			
1903.					
September	5	222			221
October	3	256	1	1	234
November	6	218			236
December	1	279			280
1904.					
January	6	206	1	1	301
February	6	201	1	3	368
March	12	222		8	460
April	7	191	1	9	442
May	7	184	2	3	278
June	8	134	2	4	129
July	6	141	2	6	152
August	10	131			127
Total	77	2,385	10	35	3,227

Month.	Crew inspected.	Passengers inspected.		Persons held in quarantine.	Persons bathed and effects disinfected.	Crew and passengers vaccinated.
		Cabin.	Steerage.			
1903.						
September	4,544	275	2,614			
October	4,376	256	2,050	3	3	217
November	4,717	388	1,981			520
December	4,645	335	1,636			508
1904.						
January	3,760	422	1,564	38	38	490
February	4,051	315	1,526	38		495
March	4,654	447	1,626			380
April	4,273	480	1,455	9	9	234
May	3,916	361	1,327	9	9	254
June	3,122	249	1,159	22	22	200
July	2,953	279	1,333	76		183
August	3,344	300	1,071	1		121
Total	48,355	4,107	19,342	196	81	3,662

OUTGOING.

Month.	Vessels inspected.	Vessels in quarantine.	Vessels disinfected.	Pieces baggage disinfected.	Crew inspected.	Passengers inspected.	Persons bathed and clothing disinfected.
1903.							
September	223	3	3	64	2,455	1,666	32
October	228			6	3,261	2,537	
November	235				1,625	1,049	
December							
1904.							
January							
February							
March							
April							
May							
June							
July							
August							
Total	686	3	3	70	7,341	5,252	32

Inspection of aliens at the port of Iloilo, P. I., during the year ended August 31, 1904.

Month.	Inspected.	Certified.	Deported.	Cause of deportation.
1903.				
September	17			
October	1			
November	1			
December	1			
1904.				
January	39			
February	10			
March	29			
April	44	1		
May	70	4	3	2 trachoma; 1 ulcer of skin, feet, chronic.
June	18			
July	3	1	1	1 trachoma.
August	29	1	1	Do.
Total	262	7	5	

OFFICE OF THE UNITED STATES QUARANTINE OFFICER,
Cebu, P. I., September 1, 1904.

SIR: I have the honor to make the following brief narrative report relative to the transactions of this station for the year ended August 31, 1904:

Smallpox and leprosy have been present during the year, as well as in other parts of the islands, and both of these diseases have been found on incoming vessels. We have made in this port 4,036 vaccinations, all but a few of those vaccinated being sailors employed on the local boats. This should undoubtedly greatly lessen the chances of smallpox being conveyed by vessels.

The boats which give the most trouble in this port, and which have been and always will be the means of conveying contagion, are the bancas, or paraos, as they are called elsewhere. These are native craft of from under 1 to 33 tons burden. On account of the very narrow beam, they are all built with outriggers. They carry from 3 to 85 people, including crew and passengers, and enter ports at times as high as 25 a day. Few of them are in good hygienic condition, and any perfect control of them is very difficult.

In July a case of plague was found in the town in a Filipino boy. This boy had not been away from Cebu and the origin of the case could not be traced, although it was said that a case of plague had occurred in the same house a year before. There have been all told this year 20 cases of bubonic plague, mostly involving the femoral glands, although there have been a few cases in which the glands at the angle of the jaw have been affected. These latter have occurred in children. The disease has been typical clinically, and since receiving the microscope I have been able to demonstrate the bacillus pestis in smears from the glands.

In looking over the records of the station it will be seen that my predecessor, Passed Asst. Surg. H. A. Stansfield, saw and reported 5 cases of plague, in none of which was the origin determined. This is also true of the cases reported during the last year. From the facts that all of those infected had been residing in Cebu for some time previous to the development of plague, that no origin could be traced in any case, and that they appeared at such irregular and lengthy intervals in different parts of the city, it is probable that plague has been here for some time and is only awaiting the proper conditions to become epidemic.

No plague was found on any vessel arriving at this port during the year, and to guard against the exportation of the disease by infected rats all the vessels sailing from this port have been fumigated with sulphur twice, and this fumigation will be done twice again during the coming year. There has been no noticeable increased mortality among rats in Cebu.

After constant scolding and threatening, the captains are at last taking an interest in keeping their boats clean, and with the end of the year there has been a great improvement in the sanitary condition of the coastwise boats.

On November 7, 1903, a board composed of Passed Asst. Surg. Victor G. Heiser, chairman, Asst. Surg. Carroll Fox, and Asst. Surg. J. D. Long, recorder, met to select a suitable site for a quarantine station at this port. The first choice was a small island in Cebu harbor, known as Cauit Island; the second choice a piece of land on Mactan Island, opposite Cebu, and the third choice some land situated near the second choice. Cauit Island is by far the best of the three, as there is a small harbor well protected from the strong winds; plenty of water can be gotten close to the shore, so that only a small wharf need be built, and there is good holding ground. At present there is no fresh water on the island, but this difficulty can be overcome by a deep well, by a distilling apparatus, by collecting rain water, or by some other means. This island was claimed by another party and the case was taken to court and was decided in favor of the government. It was then appealed to the next higher court and is now awaiting trial.

During the year there were 24 immigrants examined, one of whom was certified for deportation. Nearly all of the immigrants coming to this port enter by way of Manila and undergo the medical examination there.

Respectfully,

CARROLL FOX,
Assistant Surgeon.

The CHIEF QUARANTINE OFFICER FOR THE PHILIPPINE ISLANDS.

Statistics of quarantine transactions at the port of Cebu, P. I., for the year ended August 31, 1904.

INCOMING.

Month.	Vessels inspected from—		Vessels in quarantine.	Vessels disinfected.	Bills of health issued.	Pieces of baggage disinfected.
	Foreign ports.	Domestic ports.				
1903.						
September	9	319		43	135	
October	7	311	3	4	165	36
November	4	286	1	2	125	
December	8	352		1	140	
1904.						
January	2	506			132	
February	8	532			134	
March	15	622	2	3	148	29
April	4	438	2	15	129	17
May	6	414		14	115	
June	5	364		2	129	
July	9	412		8	145	
August	5	342	2	6	150	
Total	82	4,898	10	98	1,647	82

Month.	Crew inspected.	Passengers inspected.		Persons held in quarantine.	Persons bathed and effects disinfected.	Crew and passengers vaccinated
		Cabin.	Steerage.			
1903.						
September	5,034	135	1,443			
October	5,121	157	1,431	28	28	822
November	4,588	174	1,527		70	203
December	5,256	223	1,576		55	400
1904.						
January	5,692	282	2,728			403
February	6,236	211	2,296			781
March	7,243	315	7,243	18	20	698
April	5,568	266	1,970	26	8	280
May	5,405	288	1,907			148
June	4,789	255	1,894			223
July	5,697	298	1,934			189
August	5,438	250	1,323	11	10	32
Total	66,067	2,854	27,272	83	191	4,185

Report of inspection of aliens at the port of Cebu, P. I., during the year ended August 31, 1904.

Month.	Number inspected.	Number certified.	Number deported.	Cause of deportation.
1903.				
September				
October	1			
November				
December	1			
1904.				
January	3			
February	1			
March				
April				
May				
June	9			
July	5			
August	4	1	1	1 trachoma.
Total	24	1	1	

OFFICE OF THE UNITED STATES QUARANTINE OFFICER,
Jolo, P. I., September 1, 1904.

SIR: I have the honor to transmit herewith the annual report of the quarantine transactions at the port of Jolo, Philippine Islands, for the year ended August 31, 1904. The tabulated statistical report will be found elsewhere.

Jolo has been maintained as an inspection station by the Service since May 20, 1903, after a comparison of the relative merits of it and Zamboanga in a report made by Asst. Surg. J. W. Amesse to the chief quarantine officer. Previous to this time the quarantine work was conducted by the military authorities.

For the purpose of boarding, a rowboat and two attendants are employed at a cost of $20 United States currency per month. There are no facilities for the handling of infected vessels. Should such an emergency arise it would be necessary to remand the vessel to Iloilo, or Cebu, about thirty hours' steaming from Jolo. So far the necessity has never arisen.

The average number of vessels inspected per month is about 25. Of these there are three regular steamers from Singapore via British North Borneo ports. The other vessels are all interisland vessels, a number being small native boats of the type known as sapits, and a few pearlers.

One of the principal sources of danger to the southern Philippines is from the native boats trading between the Borneo coast and the adjacent islands of the Sulu Archipelago. The earliest recorded invasion of cholera came through the island of Tawi Tawi into the Philippine Islands. At present no sanitary supervision can be exercised over these vessels, as they rarely come to Jolo; to do so, they would have to make a journey of several hundred miles, which, naturally, they do not do, unless there is some pressing necessity.

As a result of ten months' observation and service at this port, I would recommend that an acting assistant be appointed to take charge of the station, to be paid a suitable fee, say $5 per vessel, and that the quarantine work be confined to the foreign ships. This would make the running expenses about $30 per month. Arrangements can be made to have one of the army surgeons on duty at Jolo do this work at the rate named. It would also be wise to have a similar arrangement made at the port of Zamboanga. This would give the Service control of all the ports of entry in the Philippines.

Systematic vaccination of the crews of all vessels touching at this port has been carried on for several months with good results. No difficulties have been met with in vaccinating natives, as they look upon it as a matter of course. Whether they appreciate the benefit they derive from it I do not know.

Respectfully,

M. K. GWYN,
Assistant Surgeon.

The CHIEF QUARANTINE OFFICER FOR THE PHILIPPINE ISLANDS.

Statistics of incoming quarantine transactions at the port of Jolo, P. I., for the year ended August 31, 1904.

Month.	Vessels inspected from—		Bills of health issued.	Crew inspected.	Passengers inspected.		Crew and passengers vaccinated.
	Foreign ports.	Domestic ports.			Cabin.	Steerage.	
1903.							
September	2	19	13	758	68	129	
October	2	18	19	1,019	109	679	
November	1	28	16	1,176	134	1,339	
December	5	14	13	834	86	293	
1904.							
January	4	23	14	1,080	177	306	50
February	3	26	15	1,214	148	283	106
March	5	38	24	1,232	158	231	23
April	1	40	20	1,021	135	437	241
May	2	24	26	1,225	147	462	
June	1	42	37	843	104	456	
July	1	35	34	867	107	428	
August	2	5		149	3	40	
Total	29	312	231	11,418	1,376	5,083	420

Report of inspection of aliens at the port of Jolo, P. I., during the year ended August 31, 1904.

Month.	Inspected.	Certified.	Deported.	Cause of deportation.
1903.				
September	17			
October	42			
November	9			
December	24			
1904.				
January	17			
February	20			
March	8			
April	18			
May	31			
June	22			
July	10			
August				No report.
Total	218			

FINANCIAL STATEMENT—QUARANTINE SERVICE IN THE PHILIPPINE ISLANDS.

I.—General appropriation account insular treasurer, year ended August 31, 1904.

[Philippine currency.]

DEBITS.

To balance appropriation, Act 807, quarantine service, September 1, 1904	₱74,126.26
To appropriation, Act 1010, quarantine service	4,280.00
To appropriation, Act 1049, quarantine service	67,750.00
To appropriation, Act 1188, quarantine service	10,000.00
To appropriation, Act 1155, quarantine service	15,300.00
Total	171,456.26

CREDITS.

By withdrawals by disbursing officer	₱101,880.00
By amount expended by auditor, claim J. W. Amesse	602.66
By amount credited insular purchasing agent	35,124.04
By balance unwithdrawn	33,849.56
Total	171,456.26

II.—Statement of funds (disbursing officer), appropriations of fiscal year 1903.

DEBITS.

1903.		
Oct. 10.	Received from treasurer, A. W. 3974	₱6,740.00
Nov. 7.	Refund to expenditures	16.19
1904.		
June 11.	Received from treasurer, A. W. 5014	83.63
	Total	6,839.82

CREDITS.

1903.		
Nov. 7.	Refund to treasurer, receipt 3327	₱16.19
1904.		
June 30.	Balance to be accounted for by disbursements	6,823.63
	Total	6,839.82

III.—Statement of funds (disbursing officer), appropriations of fiscal year 1904, period from September 1, 1903, to August 31, 1904.

[Philippines currency.]

DEBITS.

1903.		
Sept. 1.	Cash balance on hand from August	₱8,526.26
Sept. 7.	Refunds to expenditures	119.00
Sept. 30.	Received from treasurer, A. W. 3888	6,000.00
Oct. 12.	Refunds to expenditures	131.00
Oct. 26.	Received from treasurer, A. W. 4002	12,000.00
Oct. 26.	Refunds to expenditures	71.00
Nov. 25.	Refunds to expenditures	79.00
Nov. 26.	Received from treasurer, A. W. 4159	6,000.00
Dec. 11.	Received from treasurer, A. W. 4212	4,280.00
Dec. 12.	Refunds to expenditures	103.00
Dec. 18.	Received from treasurer, A. W. 4256	5,500.00
1904.		
Jan. 9.	Refunds to expenditures	120.00
Feb. 11.	Received from treasurer, A. W. 4489	7,500.00
Feb. 25.	Received from treasurer, A. W. 4561	9,000.00
Feb. 25.	Refunds to expenditures	50.00
Mar. 25.	Received from treasurer, A. W. 4704	8,000.00
Mar. 28.	Refunds to expenditures	90.00
Apr. 2.	Refunds to expenditures	88.00
Apr. 28.	Received from treasurer, A. W. 4846	9,000.00
May 3.	Refunds to expenditures	65.00
May 13.	Received from treasurer, A. W. 4897	10,000.00
June 16.	Refunds to expenditures	69.00
June 27.	Received from treasurer, A. W. 5088	9,300.00
July 7.	Refunds to expenditures	90.00
	Total	96,181.26

CREDITS.

1904.		
July 19.	Refund to treasurer, receipt 506	₱277.90
Aug. 31.	Cash balance on hand August 31, 1904	4,406.73
Aug. 31.	Balance to be accounted for by disbursements	91,496.63
	Total	96,181.26

IV.—Statement of funds (disbursing officer), appropriation for fiscal year 1905, act 1155.

DEBITS.

1904.		
July 28.	Received from treasurer, A. W. 5218	₱6,300.00
Aug. 12.	Refunds to expenditures	93.00
Aug. 30.	Received from treasurer, A. W. 5405	9,000.00
	Total	15,393.00

CREDITS.

1904.		
Aug. 31.	Cash balance on hand	₱9,518.98
Aug. 31.	Balance to be accounted for by disbursements	5,874.02
	Total	15,393.00

V.—Special appropriation, act 831, enacted August 12, 1903.

DEBITS.

Cebu Quarantine Station	₱60,000.00
Launch	8,000.00
Total	68,000.00

CREDITS.

Expenditures	0.00
Balance available August 31, 1904	₱68,000.00
Total	68,000.00

(Expenditures authorized, ₱7,975.)

Statement of funds to be accounted for by expenditures during the period from September 1, 1903, to August 31, 1904.

Disbursements by disbursing officer, funds fiscal year 1903	₱6,823.63
Disbursements by disbursing officer, funds fiscal year 1904	91,496.63
Disbursements by auditor, claim, funds fiscal year 1904	602.66
Insular purchasing agent, supplies, funds fiscal year 1904	34,653.06
Disbursements by disbursing officer, funds fiscal year 1905	5,874.02
Insular purchasing agent, supplies, funds fiscal year 1905	470.98
Total	139,920.98

EXPENDITURES.

September, 1903:		
Compensation of personnel	₱6,807.63	
Office and general service expenses	567.08	
Launch and barge expenses, supplies and repairs	2,388.16	
Station supplies and disinfectants	3,868.06	
Repairs to buildings and wharves	329.41	
		₱13,960.34
October, 1903:		
Compensation of personnel	6,129.24	
Office and general service expenses	317.34	
Launch and barge expenses, supplies and repairs	1,319.01	
Station supplies and disinfectants	847.74	
Repairs to buildings and wharves	5,900.00	
New construction and new equipment	41.00	
		14,554.33
November, 1903:		
Compensation of personnel	6,199.16	
Office and general service expenses	1,100.33	
Launch and barge expenses, supplies and repairs	157.00	
Station supplies and disinfectants	693.53	
		8,150.02
December, 1903:		
Compensation of personnel	6,157.78	
Office and general service expenses	5,510.47	
Launch and barge expenses, supplies and repairs	3,062.63	
Station supplies and disinfectants	3,536.09	
Repairs to buildings and wharves	12.32	
New construction and new equipment	1,087.02	
		19,366.31
January, 1904:		
Compensation of personnel	46.00	
Office and general service expenses	160.00	
Launch and barge expenses, supplies and repairs	14.27	
Station supplies and disinfectants	772.64	
		992.91
February, 1904:		
Compensation of personnel	11,911.05	
Office and general service expenses	2,274.54	
Launch and barge expenses, supplies and repairs	140.38	
Station supplies and disinfectants	866.60	
New construction and new equipment	308.00	
		15,500.57
March, 1904:		
Compensation of personnel	6,344.19	
Office and general service expenses	1,692.85	
Launch and barge expenses, supplies and repairs	1,940.84	

March, 1904—Continued.		
Station supplies and disinfectants	₱2,324.63	
Repairs to buildings and wharves	1,595.10	
New construction and new equipment	692.12	
		₱14,589.73
April, 1904:		
Compensation of personnel	5,746.75	
Office and general service expenses	1,274.07	
Launch and barge expenses, supplies and repairs	1,452.00	
Station supplies and disinfectants	4,080.45	
New construction and new equipment	927.46	
		13,480.73
May, 1904:		
Compensation of personnel	6,485.53	
Office and general service expenses	2,273.83	
Launch and barge expenses, supplies and repairs	1,240.59	
Station supplies and disinfectants	401.59	
Repairs to buildings and wharves	300.00	
New construction and new equipment	517.49	
		11,219.03
June, 1904:		
Compensation of personnel	6,203.36	
Office and general service expenses	1,567.54	
Launch and barge expenses, supplies and repairs	2,292.51	
Station supplies and disinfectants	7,296.93	
Repairs to buildings and wharves	289.97	
New construction and new equipment	173.78	
		17,824.09
July, 1904:		
Compensation of personnel	40.00	
Station supplies and disinfectants	42.00	
		82.00
August, 1904:		
Compensation of personnel	5,874.02	
Office and general service expenses	199.00	
Launch and barge expenses, supplies and repairs	1,948.38	
Station supplies and disinfectants	1,249.58	
Repairs to buildings and wharves	206.93	
New construction and new equipment	723.01	
		10,200.92
Total		139,920.98

Total expenditures quarantine service in the Philippine Islands during the year ended August 31, 1904.

[Philippine currency.]

DETAILS.

Compensation of personnel	₱67,944.71
Office and general service expenses	16,937.05
Launch and barge supplies and repairs	15,443.61
Station supplies and disinfectants	25,979.84
Repairs to buildings and wharves	8,633.73
New construction and new equipment	4,982.04
Total	139,920.98

Expenditures by station

[Philippine currency.]

Manila:		
General service expenses	₱31,928.45	
Launch expenses	12,283.06	
New station equipment	1,189.25	
		₱45,400.76

Mariveles:		
General service expenses and supplies	₱42,907.99	
Repairs to buildings and wharves	.8,633.73	
New construction and new equipment	2,225.46	
		₱53,767.18
Iloilo:		
General service expenses	6,623.63	
Launch and barge expenses	9,491.07	
New station equipment	656.83	
		16,771.53
Cebu:		
General service expenses	8,535.61	
Launch and barge expenses	8,608.30	
New station equipment	656.83	
		17,800.74
Jolo:		
General service expenses	5,408.22	
Boat expenses	518.88	
New station equipment	253.67	
		6,180.77
Total		139,920.98

Statement of fiscal year 1904—General appropriations and expenditures for the quarantine service in the Philippine Islands from July 1, 1903, to August 31, 1904.

FISCAL YEAR 1904.

Quarantine service (Acts 807, 1010, 1049, and 1188).	Appropriations.	Expenditures.
Salaries and wages	₱74,800.00	₱72,393.46
Transportation	30,600.00	16,265.61
Commutation for quarters	13,210.00	13,071.30
Support Mariveles Quarantine Station	40,240.00	32,401.40
Contingent expenses	8,780.00	4,094.32
Total	167,630.00	[a] 138,226.09

₱12,076 retained against outstanding obligations, uncompleted contracts, and unpaid insular purchasing agent's bills.

[a] Total disbursed to August 31, 1904.

FISCAL YEAR 1905.

Appropriation Act 1155.	Amount of appropriation available.	Expenditures.
Salaries and wages	₱12,800.00	₱5,874.02
Transportation	470.98	470.98
Commutation for quarters	2,500.00	
Support Mariveles Quarantine Station	93.00	
Total	15,863.98	[a] 6,345.00
Cash balance on hand		9,518.98

[a] Total disbursed to August 31, 1904.

Respectfully,

VICTOR G. HEISER,
Passed Assistant Surgeon,
Chief Quarantine Officer for the Philippine Islands.

The SECRETARY OF THE INTERIOR
FOR THE PHILIPPINE ISLANDS,
Manila, P. I.

APPENDIX F.

REPORT OF THE ATTENDING PHYSICIAN AND SURGEON, PHILIPPINE CIVIL HOSPITAL.

PHILIPPINE CIVIL HOSPITAL,
Manila, P. I., September 15, 1904.

SIR: I have the honor to report the third year's work of this bureau as follows:

The work of the Philippine Civil Hospital for the past year has been the same in general as in those preceding, the results somewhat better.

A much larger number of cases of amœbic dysentery have been treated than in any previous year, and while this disease ranks among the gravest here, the death rate has been less, i. e., last year there were 77 cases of amœbic dysentery treated with 3 deaths, while this year there were 253 cases and only 3 deaths. Of these 230 were treated by the hospital staff. It will be seen from the above that the mortality for the past year was about 1⅓ per cent, as compared with 4 per cent for the year preceding.

One of the greatest needs of the hospital has been a separate ward, or building, for maternity cases. This will soon be remedied as authority has been granted to rent an additional building for the attendants' quarters, and the cottage hitherto occupied by them to be utilized as a maternity pavilion.

Cases treated during the year were as follows, viz:

Diagnosis.	Cases treated.		Diagnosis.	Cases treated.	
	Male.	Female.		Male.	Female.
Alcoholism	28		Blepharitis	1	
Alcoholism, chronic	2		Bubonic plague		1
Anæmia, secondary	2	2	Bulimia	1	
Aneurism, thoracic	2		Catarrh, intestinal	3	
Ankylostomiasis	14		Cephalalgia	6	
Anorexia	2		Cholera infantum	1	
Apoplexy	1		Cholera morbus	2	
Arthritis	3		Cholelithiasis	1	
Arthritis, gonorrheal	6		Cholera suspect	2	
Arthritis, subacute	2		Cirrhosis, hepatic	1	
Ascariasis	30	5	Colic, biliary	1	
Ascites		1	Colic, renal	3	
Asthma	10	1	Colitis		2
Asphyxiation, partial	17		Catarrhal	5	
Balantidum coli	1		Conjunctivitis, acute:		
Basedow's disease		1	Catarrhal	18	
Beriberi	13		Purulent	14	
Blindness	1		Constipation	32	4
Bronchitis:			Convalescence from malaria	11	
Acute	32	4	Convalescence from dengue	1	
Subacute	13		Convalescence from enteric fever		1
Chronic	5		Convalescence after delivery		1

Diagnosis.	Cases treated.	
	Male.	Female.
Convalescence from seasickness		1
Cramp, occupation	1	
Cystitis:		
Acute	7	
Chronic	1	1
Subacute	1	
Dermatitis:		
General	1	
Purulent	1	
Venenosum	1	
Debility, general		1
Dengue	41	14
Dhobie itch	8	1
Diplopia, traumatic	1	
Dilatation of heart, acute	1	
Dilatation of stomach	1	
Dysentery:		
Amœbic	192	58
Amœbic, with complication	3	
Catarrhal	53	9
Bacilleary, acute	2	
Dysmenorrhea		1
Eczema	1	
Endometritis:		
Acute		5
Chronic		12
Subacute		2
Endometritis and antiflexion of uterus		2
Entero-colitis	24	8
Enteritic, acute	38	
Enteralgia	2	
Enteric fever	4	
Epydidymitis	5	
Epistaxis	1	
Excitation, cerebral	1	
Erythema, toxic	1	
Fecal impaction	1	1
Febricula	13	
Gastralgia	1	
Gastric fever	1	
Gastritis:		
Acute	25	2
Chronic	8	2
Gastro-duodenitis	2	1
Gastro-enteritis:		
Acute	10	1
Chronic	2	
General shock	1	
Gonorrhea	25	
Gleet	2	
Gout	1	
Glycosuria, transient	1	
Heart failure, due to degeneration of myocardium	1	
Hepatitis:		
Acute	2	
Chronic	1	
Hodgkin's disease	1	
Hyperemia, central	1	
Hydropsia	1	
Hysteria	1	1
Infection by strongyloids	2	
Insanity	1	
Alcoholic	1	
Imperfect closure of foramen ovale causing asphyxia	1	
Idiocy, malarial	1	
Iritis:		
Plastic	1	
Syphilitic	1	
Jaundice, catarrhal	2	
Keratitis:		
Interstitial	3	
Ulcerative	1	
Lead poisoning, chronic	1	
Lumbago	8	
Lymphaditis	2	
Lymphadenitis, purulent	1	
Malaria:		
Tertian	94	5
Quartan	1	
Æstivo autumnal	71	4
Malingerer	1	
Marasmus	1	
Melancholia	1	
Menorrhagia		2
Mercurial poisoning, acute	1	
Morphinism	1	
Myalgia	1	
Myxœdema		1
Nephritis:		
Interstitial	11	
Parenchymatous	4	3
Parenchymatous, chronic	8	
Nervousness of pregnacy		1
Neurasthenia	12	5
Neuralgia	1	
Intercostal	1	
Trifacial	4	
Neuritis:		
Peripheral	2	1
Alcoholic	2	
Multiple	1	1
Nephro cystitis filorial origin		1
Nymphomania		1
Orchitis:		
Acute	25	
Chronic	2	
Syphilitic	1	
Obstruction, intestinal	1	
Organic heart disease	1	1
Otitis media:		
Acute	8	1
Catarrhal	1	
Suppurative	6	
Paralysis:		
Facial	1	
General	1	
Paraplegia, partial, with neurasthenia	1	
Parotitis, epidemic, acute	2	
Peritonitis:		
Tubercular		1
Acute, purulent	1	
Perihepatitis	3	1
Pharyngitis, acute	3	
Phimosis	1	
Phlebitis:		
Femoral	2	
Inguinal	1	
Pleurisy, plastic	1	1
Pleurisy with effusion	1	
Pneumonia, broncho	2	1
Pneumonia, lobar	5	
Prickly heat	1	
Ptomain poisoning	7	2
Proctitis	1	
Rheumatism:		
Subacute	10	
Chronic	2	
Muscular	6	
Sciatica	4	
Scrofula	1	
Septicæmia	1	
Hemorrhagical	2	
Smallpox suspect	3	1
Syncope	1	
Syphilis:		
Primary	8	
Secondary	8	
Tertiary	2	
Tachycardia	2	
Tetanus	1	
Tænia	3	
Thrombosis, femoral	1	
Tonsilitis:		
Follecular	1	1
Phlegmonous	2	
Thrombosis iliac	1	
Trichocephaliasis	6	4
Tuberculosis:		
Acute, pulmonary	3	1
Chronic, pulmonary	23	1
Acute, milliary	2	
Typhoid fever		2

Diagnosis.	Cases treated. Male.	Female.
Urethritis:		
Acute	14	1
Chronic	2	
Uncinariasis	16	
Urticaria	3	
Undertemined	6	
Varioloid	1	
Variola hemorrhagica		1
Vertigo	1	
Vomiting of pregnancy		4

SURGICAL CASES.

Abrasion	4	
Abortion		5
Abscess:		
Of breast		3
Alveolar	1	
Arm	1	
Axillary	1	
Back	1	
Buttock	1	
Cerebral	1	
Cheek	1	
Finger	2	
Foot	3	
Hand	2	
Ischio-rectal	5	1
Hepatic	6	3
Hepatic suspected	1	
Hepato, pulmonary	1	
Neck	1	
Peri-urethral	1	
Extra peritoneal	1	
Thigh	4	2
Retro vaginal		1
Vulva		1
Adenitis:		
Cervical	3	
Inguinal	25	
Adeno carcinoma of breast		1
Amputation of:		
Fingers	7	
Great toe	1	
Arm	1	
Forearm	1	
Leg	1	
Aneurism, femoral	1	
Appendicitis:		
Acute, catarrhal	5	3
Chronic	3	1
Recurrent		1
Suppurative	5	1
Arthritis, tubercular	1	
Burns of body and hands	1	1
Burns of face and hands	3	
Burns of legs	2	
Burns of body	4	
Carbuncle of neck	1	
Carcinoma of breast		2
Cataract extraction		2
Carcinoma of stomach	1	
Cellulitis of hand	3	
Cellulitis of toe	1	
Cellulitis	6	
Circumcision	4	
Concussion cerebral	1	
Curretage of uterus		4
Cyst, ovarian		3
Dislocation:		
Little finger	1	
Two feet	1	
Exhaustion from loss of blood	1	
Empyema of antrum of Highmore	2	
Erysipilis	1	
Enucleation of eye	1	
Epididymitis	1	
Fib omata mammæ		1
Fissure in ano	1	2
Fistula in ano	4	3
Fractures:		
Cavicle	3	
Colles	1	
Humerus	2	1
Fractures—Continued.		
Humerus, compound	1	
Radius and ulna, compound	3	
Skull, compound	4	
Femur	2	
Femur, compound	1	
Tibia	1	
Tibia and fibula	1	
Inferior maxilla	1	
Rib	1	
Radius	3	
Furuncolosis	4	1
Growth on left breast	1	
Gingivitis	1	
Growth granulomatous of hand	1	
Hæmatoma of cheek	1	
Hæmatoma of ovary		1
Hemorrhage	2	
Hemorrhage from conjunctiva	1	
Hemorrhage intra-ocular	1	
Hemorrholds:		
External	22	3
Internal	3	1
Hernia:		
Inguinal, oblique	2	
Umbilical cord, strangulated	1	
Hernia of thrombosed spermatic cord	1	
Hydrocele	5	
Infected foot	2	
Infected hand	1	1
Infected leg	4	
Infected toe	6	
Lacerated wound of hand	4	
Lacerated cervix, rectocele and cystocele		1
Osteo-myelitis tubercular	2	
Oophritis		2
Paraphimosis	2	
Perforation of cornea	2	
Periostitis	2	
Perforation of abdominal wall and stomach		1
Polyp uterine		1
Polyp anal	1	
Polyp nasal	1	
Prolapse of rectum	3	
Ptryglum	2	
Retroversion uteri		3
Retroflexion uteri		1
Salpingitis purulent		1
Salpingo oophoritis, chronic		3
Sarcoma		1
Sprained ankle	7	1
Sprained hand	4	
Sprained back	3	
Sprained knee	2	
Staphyloma of cornea	1	
Strabismus external	1	
Supernumerary thumb	1	
Suspected labor		1
Synovitis	4	
Torticollis	2	
Tumor of neck	1	
Tumor:		
Right inguinal region	1	
Splenic	1	
Ulcer:		
Corneal	1	
Leg	19	
Undescended testicle	1	

SURGICAL CASES—Continued.

Diagnosis.	Cases treated.	
	Male.	Female.
Vaccinia	2	
Varicocele	3	
Varicose veins and ulcer of leg	1	
Veruca of scrotum	1	
Wound:		
Contused, of arm	10	
Contused, of back	5	
Contused, of head	5	
Contused, of foot	13	
Contused, of finger	5	
Contused, of leg	12	
Contused, of side	5	
Contused, of thorax	1	
Gunshot, arm	2	
Gunshot, abdomen	1	
Gunshot, foot	4	
Gunshot, hip	1	
Gunshot, knee	1	
Gunshot, thigh	1	
Incised chest	2	
Incised, clavicular region	1	
Incised forearm	1	
Incised foot	2	
Wound—Continued.		
Incised face	1	
Incised leg	2	
Incised neck	3	
Incised wrist	2	
Incised thigh	1	
Infected foot	14	
Infected leg	2	
Infected hand	4	
Infected neck	1	
Lacerated abdomen	1	
Lacerated head	11	
Lacerated hand	4	
Lacerated foot	4	
Lacerated groin	1	
Lacerated perrineum	1	
Lacerated leg	1	
Lacerated thigh	1	
Punctured hand	1	
Punctured foot	1	
Punctured chest	1	
Punctured abdomen	1	

DEATHS.

Abscess of liver, amœbic	2	
Alcoholism, acute	1	
Aneurism, thoracic	1	
Apoplexy	1	
Beriberi	1	
Beriberi and tuberculosis of lungs	1	
Bubonic plague		1
Burns of body and hands		1
Carcinoma of stomach	1	
Carcinoma of right breast		1
Dilatation of heart	1	
Dysentery, acute, bacillary	1	1
Dysentery, amœbic	2	1
Exhaustion from loss of blood	1	
Erysipelas and cellulitis	1	
Hemorrhage, cerebral	1	
Hemorrhage and shock following incised wound of neck and wrist	1	
Hernia, umbilical, strangulated	1	
Heart failure	1	
Hemorrhagic septicemia and acute nephritis		1
Imperfect closure of foreanus ovale	1	
Malarial fever, æxtivo autumnal		1
Nephritis:		
Acute	1	
Chronic	3	
Organic heart disease	1	
Peritonitis, acute, purulent	1	
Pneumonia:		
Broncho	2	
Lobar	1	
Septicemia following childbirth		1
Tuberculosis:		
Pulmonary, acute	4	
Miliary, acute	2	
Typhoid fever	2	1
Variola hemorrhagica		1
Stab wound of abdomen	1	
Total	37	10
Grand total	47	

Mortality about 2½ per cent. Total deaths treated by hospital staff was 33, of whom 13 were in a dying condition when admitted, which shows a mortality of only 1¾ per cent, approximately, of cases treated by the hospital staff.

SUMMARY.

Civil employees:	
Pay patients	996
Free patients	465
Private patients	286
Emergency cases	162
Total	1,909

Number of—	
Americans and Europeans	1,325
Filipinos	560
Indians	6
Hindoos	2
Japanese	10
Chinese	6
Total	1,909

Classified as to departments as follows:

Department.	Number.	Department.	Number.
Agriculture	18	Insular cold stores	29
Architecture	10	Insular purchasing agent	79
Attorney-general's office	9	Internal-revenue	2
Auditor's office	30	Improvement of port of Manila	9
Assessors and collectors	10	Justice	11
Benguet road	18	Laboratories	25
Bilibid prison	7	Light-house construction	9
Board of health	32	Land registration	1
City attorney's office	4	Mining bureau	2
City engineer	3	Municipal board	4
Civil sanitarium	1	Police	230
Civil hospital	33	Posts	35
Civil-service board	5	Provincial governments	18
Census bureau	1	Pail system	2
Coast guard and transportation	58	Prosecuting attorney's	6
Coast and geodetic survey	3	Public printing	33
Commerce and police	1	Public lands	2
Customs	96	Philippines constabulary	132
Executive bureau	34	Sheriff's	7
Engineering and public works	90	Streets, parks, etc	21
Exposition board	3	Secret service	15
Education	157	Treasury bureau	31
Ethnological survey	2	Private patients	286
Engineering	38	Emergency cases	162
Forestry bureau	31		
Fire department	70	Total	1,909

Number of days spent in hospital by all patients, 23,396.

Medicines and medical supplies were furnished other bureaus for the use of civil employees on duty outside Manila, except the police and fire departments, which were furnished upon request of the police surgeon, as follows:

Bureau of education	₱49.50	Bureau of customs	₱14.35
Bureau of engineering	170.52	Executive bureau	1.89
Department of police	153.75	Philippines constabulary	5.32
Bureau of mining	6.42	Forestry bureau	54.29
Exposition board	8.19	Fire department	101.92
Bureau of government laboratories	10.86		577.01

Total number of prescriptions filled, 8,191. Total number of visits by patients to the office of the attending physician and surgeon was 12,900; total number outside calls made by the attending physician and surgeon was 3,650; total number surgical dressings done in dressing room, 8,400.

I particularly call to your attention the fact that although Manila is in the Tropics and that the civil hospital has many tropical diseases to handle, the death rate is extremely low. This has been true ever since the hospital was opened and undoubtedly proves that the climate of Manila is far better than most tropical countries afford. In this respect I desire to state that it is my belief that if Americans will take reasonable care of their living and avoid infecting

themselves with the amœba of dysentery, they can enjoy almost as good physical condition as in the southern portion of the United States.

It was my desire to establish a modern dairy in connection with the civil hospital, but the bureau of agriculture has very happily relieved us of that burden. When this most useful institution is thoroughly established and the milk pasteurized, we are satisfied that mortality among babies will decrease and much of the difficulty in treating liquid diet patients obviated, as the canned milk we are compelled to use varies very much in contents, quality, and nutrition.

I have been surprised at the adaptability and faithfulness of three native women whom we have employed in the women's ward, and again earnestly urge the beginning of a training school. The knowledge these acquire will enable them to act as missionaries of hygiene among these people, and will, I am sure, tend to lessen the mortality, especially in confinement cases.

The morale and efficiency of the attendants is the best that the civil hospital has yet had, and the nurses are continuing their standard of perfect work.

I respectfully commend the faithful and efficient work of the house surgeons, Drs. Giles B. Cook and William J. Mallory.

Respectfully submitted.

H. EUGENE STAFFORD,
Attending Physician and Surgeon,
Civil Officers and Employees.

The SECRETARY OF THE INTERIOR, *Manila, P. I.*

APPENDIX G.

REPORT OF THE ATTENDING PHYSICIAN AND SURGEON, CIVIL SANITARIUM, BAGUIO, BENGUET.

CIVIL SANITARIUM, BENGUET,
Baguio, Benguet, P. I., September 1, 1904.

SIR: I have the honor to submit the report of the Civil Sanitarium, Benguet, for the year September 1, 1903, to August 31, 1904:

DISBURSEMENTS AND RECEIPTS.

The following tables give by months the receipts and disbursements of the sanitarium from September 1, 1903, to August 31, 1904. The total disbursed for salaries and wages was ₱13,336.88, for contingent expenses ₱21,241.59, and for improvement of grounds ₱1,813.44, out of the fund of ₱5,000 appropriated for that special purpose; grand total, ₱36,391.83.

The total received for attendance, subsistence, horse hire, and medicines was ₱10,273.28, and $73.50 Mexican currency, of which sum ₱1,457.50 was on account of horse hire. The demand for ponies was so constant during the season that it was determined to raise the number of ponies and equipments to 21. These were constantly in use during the busy months, and a dozen more could have been used most of the time. It was decided that the old rate of rental was too small, and the following schedule of rates, more nearly commensurate with the value received, was put into effect April 20, 1904:

Rental for one-half day	₱1.00
Rental for one day	2.00
Rental for one month	40.00
Rental to or from Naguilian	10.00
Rental to or from Twin Peaks	5.00

About a thousand prescriptions have been filled since January 1, 1904, practically all of them free. Considerable quantities of quinine, bismuth, and other drugs have been issued to the municipal secretaries and presidentes of the province, who usually pay the sanitarium a visit when their business brings them to Baguio, report the prevailing diseases of their district and request remedies.

TABLE A.—*Receipts from September 1, 1903, to August 31, 1904.*

Date.	Philippine currency.	Mexican currency.
1903.		
September	₱232.98	$73.50
October	294.58	
November	402.50	
December	601.04	
1904.		
January	528.44	
February	400.00	
March	73.00	
April	791.25	
May	2,671.50	
June	3,617.99	
July	392.00	
August	268.00	
Total	10,273.28	73.50

Disbursements from September 1, 1903, to August 31, 1904.

Date.	Salaries and wages.	Contingent expenses.	Improvement of grounds.
1903.			
September	₱1,662.67	₱1,587.89	₱500.00
October	673.50	679.10	
November	715.00	662.54	
December	745.83	1,098.32	
1904.			
January	144.00	587.65	
February	1,810.83	1,538.34	102.10
March	1,467.33	2,048.14	200.74
April	1,252.00	3,116.83	190.50
May	1,264.83	4,449.94	205.70
June	1,415.23	4,021.32	38.35
July	1,081.00	247.09	169.95
August	1,104.66	1,204.43	406.10
Total	13,336.88	21,241.59	1,813.44

Grand total, ₱36,391.83.

ATTENDANCE.

I have submitted two tables of statistics, one of which classifies the diseases treated in the sanitarium, and the other those treated in the outdoor department, including all patients who have applied to the dispensary for medicines and dressings or have been treated in their own homes by the attending physician and surgeon.

In the sanitarium we have treated 74 patients during the year, of which number 37 were Americans or Europeans, 7 Filipinos, and 30 Igorrotes. Of the total 36, or nearly one-half, were free or emergency cases. Fifty-nine of the patients came from Baguio and the neighboring villages, and 15 from Manila or distant provinces. Thirty-three were cured, 31 improved, 8 unimproved, and 3 died. Of the fatal cases, one was an Igorrote who was brought from a distant village and had bled several hours from a ruptured aneurism of the palmar arch; he was exsanguinated when admitted. Another Igorrote died of meningitis. The remaining fatal case was an American from the road camp, who had been ill several weeks with gastroenteritis, and was admitted in a dying condition. Several of the cases classified as "improved" were rapidly recovering when

they left the sanitarium, but were not yet completely cured. Three American women were confined, and 13 operations were performed, 2 major and 11 minor. In the outdoor department during the seven months ended August 31, 1904, 301 persons were treated at the dispensary or at their homes, including 98 Americans, 90 Filipinos, 94 Igorrotes, and 19 Japanese. Eight operations were performed; 335 revisits, and 183 vaccinations make a grand total of 819.

It will be noted that only about 20 per cent of the patients treated in the sanitarium wards came from a distance, the remaining 80 per cent being from this vicinity. This proportion will probably continue until transportation facilities are improved to such an extent that the sick may be brought to Baguio with promptness and comfort.

There were 115 employees of other bureaus, the majority attached to the staff of the Commission, subsisted and boarded at the sanitarium during the year, 20 private servants, and 35 so-called guests, which class includes relatives and friends accompanying patients and civil employees seeking rest or recreation. The total number of days passed in the sanitarium by patients was 1,822; guests and employees of other bureaus, 2,727; private servants, 381; total, 4,930 days. The average daily attendance for the year, not including sanitarium employees, was 13+. During the busy weeks from the middle of April to the 10th of June, when the Commission was holding its sessions in Baguio, the average daily attendance varied from 21 to 46, making a general average of 37+. The above figures do not include the sanitarium cottages, Nos. 2, 3, and 4, which were rented by the year and occupied by members of the Commission, with their families. Governor Wright occupied Cottage No. 3; Vice-Governor Ide, Cottage No. 4, and Secretary Worcester Cottage No. 2. Cottage No. 1 was occupied in part by Secretary Smith and Commissioner Luzuriaga and staff, all of whom were subsisted at the sanitarium, and in part for offices and a meeting place for the Commission. Cottage No. 5 is occupied as quarters by the attending physician and surgeon.

Many teachers and other members of the civil service applied for admission during April and May, when the sanitarium was filled, and, inasmuch as it is this very class of persons that derives the greatest benefit from a sojourn in Baguio, it was with much regret that the management was compelled to deny these applications. It is to be hoped that the additions to the sanitarium contemplated in the near future will make it possible during the coming hot season to accommodate all who apply for admission. In future, when transportation is easy, and it becomes generally known that the late fall, winter, and early spring are the most delightful seasons at Baguio, the attendance will no doubt be more evenly distributed throughout the year, instead of heaping up, as it were, during April, May, and June.

Experience strengthens my opinion expressed in previous reports that patients suffering from anæmia, nervous exhaustion, obstinate dyspepsia, and other functional diseases of the gastro-intestinal canal derive great benefit from this cool and stimulating climate, but such patients should plan to remain at least a month, preferably two months, in Baguio if they hope for permanent benefit. Such serious manifestations of used-up vitality can not be remedied in a

few days, even in our native temperate zone. A stay of two or three weeks at the sanitarium will usually benefit these patients, but after so brief a rest the trouble will be likely to recur soon after they return to their stations in the lowlands.

TABLE B.—*Cases treated in the sanitarium, September 1, 1903, to September 1, 1904.*

	Americans.		Filipinos.		Igorrotes.		Total.	From Baguio or vicinity.	From Manila or provinces.	Cured.	Improved.	Not improved.	Died	Remarks.
	M.	F.	M.	F.	M.	F.								
Abscess:														
Foot			1				1	1		1				Operation.
Liver	1						1		1	1				Do.
Palm						1	1	1		1				Do.
Aneurism, palmar arch					1		1	1					1	Admitted dying.
Asthma		1			1		2	1	1	1	1			
Adenitis, inguinal	1						1	1			1			Operation.
Beriberi			1		2		3	3			3			
Bronchitis, chronic		1	1				2			1	1			
Confinement		3					3	2		3				
Constipation, chronic					2		2	2		1	1			
Dengue	2				1		3	3		3				
Dysentery:														
Amœbic	3			1			4			1	3			
Acute catarrhal	2						2	2		1	1			
Chronic catarrhal	1				1		2			1	1			
Dyspepsia, acute					2		2			1		1		
Diarrhea, chronic	1										1			
Emesis of pregnancy		1									1			
Epilepsy	1										1			
Furuncles, chronic		1									1			
Gastritis, chronic	2						2			1		1		
Gastro-enteritis	1												1	Admitted in dying condition.
Hemorrhoids	1									1				Operation.
Hematoma, side					1					1				Do.
Hepatitis, chronic												1		
Malaria, chronic	2				6		8	8		3	3	2		
Meningitis, cerebro-spinal, epidemic									2	2			1	
Miscellaneous											1			
Nephritis, acute	1										1			
Neuritis, hand	1										1			
Neurasthenia	1	3							3	2	2			
Papilloma, toe										1				Do.
Rheumatism:														
Acute										1				
Chronic							1	1			1			
Sprain, elbow					1		1	1		1				
Syphilis	2						2	2			2			
Tuberculosis, pulmonary	1						1		1			1		Remained 8 days.
Ulcers, tropical	2						2	2		1	1			
Urethra, fistulæ of	1						1	1			1			Operation.
Wound:														
Foot crushing					1		1	1		1				Do.
Forearm					1		1	1		1				Do.
Hand, lacerated					1		1	1			1			Do.
Knee					1		1	1		1				
Thumb					1		1	1		1				Amputation.
Toe, infected					1		1	1			1			
Grand total	27	10	6	1	29	1	74	59	15	34	31	6	3	

TABLE C.—*Outdoor department, February 1, 1904, to August 31, 1904.*

	Americans.	Filipinos.	Igorrotes.	Japanese and Chinese.	Total.	Operations.
Abscess		1			1	
Palmar	2				2	2
Submaxillary		1			1	1
Adenitis inguinal	1				1	
Asthma, bronchial		2			2	
Alopecia areata		1			1	
Bronchitis:						
Acute	1	5	3		9	
Chronic		1			1	
Boils	3		1		4	1
Burns, arms and forearms		1			1	
Chancroid	1				1	
Constipation			1		1	
Colic, intestinal	1		1		2	
Catarrh, acute, nasal	2	2			4	
Conjunctivitis:						
Chronic			1		1	
Acute			1		1	
Concussion of brain	1				1	
Dengue	1				1	
Diarrhea, acute	6	2	1	4	13	
Dysentery:						
Acute catarrhal	1	3	1		5	
Chronic catarrhal			1		1	
Dysentery, amebic		1			1	
Dyspepsia:						
Acute	9	2	1	3	15	
Chronic		3			3	
Dysmenorrhea		1			1	
Eczema:						
Acute	1	1			2	
Chronic	1			1	2	
Fever:						
Undetermined	3	13	20	2	38	
Malarial, acute	3		10		13	
Malarial, chronic		1	2		3	
Fibroma, scalp	1				1	1
Fracture, radius (Cole)	1				1	
Goitre		1			1	
Gonorrhea, acute	1	1		1	3	
Hysteria	1				1	
Influenza	5	7	3		15	
Intertrigo				1	1	
Impetigo	1				1	
Lumbago, acute			1	1	2	
Laryngitis:						
Acute	1				1	
Chronic	1				1	
Miscellaneous	16	24	12	1	53	
Menorrhagia		1			1	
Meningitis, cerebro-spinal, acute, epidemic			3		3	
Marasmus		1			1	
Myalgia			1		1	
Neuralgia, acute	5		1		6	
Odontalgia	2				2	
Pharyngitis, acute		1			1	
Paronychia	1				1	
Rheumatism, articular:						
Chronic			1		1	
Acute			2		2	
Rheumatism, muscular	1				1	
Scabies	2	3	9	1	15	
Syphilis	6				6	
Synovitis, traumatic, knee			1		1	
Stomatitis, ulcerative, acute			3		3	
Stye			1		1	
Smallpox			1		1	
Teeth, extracted	3		1		4	
Ulcers, tropical	3				3	
Urethra, stricture of		1			1	
Urethritis, chronic	3				3	
Vaccination					183	
Wounds	6	5	7	3	21	3
Infected	1	1		1	3	
Worms, lumbricoid		2			2	
Worms, tape		1			1	
Yaws			3		3	
Total	98	90	94	19	484	8
Revisits					335	
Grand total					819	

TABLE D.—*Microscopical examinations at sanitarium laboratory, March 1, 1904, to August 31, 1904.*

	Positive.	Negative.	Total.
Microscopical examination for—			
Amœba dysenteriæ, in feces	11	44	55
Amœba dysenteriæ, in liver pus	1	3	4
Amœba, in spring water	3	4	7
B. influenzæ		2	2
B. lanceolatus	2		2
B. lepræ		1	1
B. tuberculosis	1	7	8
Diplococcus intracellularis, in spinal fluid	5		5
Ova of Ascaris lumbricoides	3		3
Plasmodium malariæ	5	34	39
Urinalyses			14
Grand total			140

DISEASES TREATED IN BAGUIO.

As will be seen from the statistics of cases treated in the sanitarium and the outdoor department, the local influence of the sanitarium has grown to considerable importance and it is gratifying to note the increase in the number of natives applying for treatment. The Igorrotes are by nature conservative in their conceptions of disease and therapeutics, and they are inclined to trust to the healing properties of feasts and incantations. However, they are slowly becoming enlightened in these matters and among the natives of Benguet there is a growing confidence in the efficacy of quinine for malaria, sulphur ointment for scabies, and opium for pain, three of the ills that bother them most.

A brief consideration of the diseases classified in the accompanying tables should be of more than ordinary interest because it demonstrates the maladies to which these primitive mountain people are most subject and because we are about to plant in their midst an important American settlement.

Beriberi.—The only cases of beriberi I have encountered in Benguet were admitted to the sanitarium within a few days of each other, beginning July 23, 1904. There were two Igorrotes and one Ilocano, all members of the local detachment of constabulary (41 men) and had lived in constabulary quarters for periods varying from three weeks to several months before coming down with the disease. The following facts are of interest as demonstrating the conditions under which this disease may develop and thrive.

The constabulary officer in command of the Baguio detachment is an ex-steward of the United States Army and has kept the quarters of his detachment in excellent sanitary condition. The building is of pine, with floor 2 to 4 feet above the ground, furnished with a rubberoid roof. The interior is warmed and dried by two stoves. The ration is varied and ample, with fresh meat for all the men, usually twice a week. In fact, the men occupy much dryer and cleaner quarters, wear much warmer clothing and consume a much more varied and nitrogenous diet than their fellow natives in private life. The only factor in the case that would predispose to the contraction of the disease is the crowded condition of the sleeping room, but it is doubtful if that has exceeded the overcrowded state of the

native shacks of the neighborhood, into most of which several families are stuffed.

Two of the patients have the disease in a mild form without cardiac symptoms; one, an Igorrote convalescing from dysentery, contracted the beriberi in severe form with complete ataxia, atrophy of the calves, and marked cardiac involvement. All three patients are slowly improving since their transfer to the sanitarium wards.

It is probable that the disease was introduced into Baguio from Twin Peaks and Camp Four, where it has been epidemic among the laborers on the Benguet Road.

Bronchitis is quite prevalent in Baguio during January and February and during the rainy season, affecting Igorrotes and Ilocanos in about equal proportion, with an occasional patient among the Americans. Among the natives insufficient clothing and shelter account for a large number of these cases, as evidenced by the groups of shivering, blue-lipped natives that huddle about the fires during the cool nights or the prolonged rain storms.

Dysentery prevails commonly among Igorrotes and Filipinos during and especially at the beginning of the rainy season. It is also frequently contracted by Americans at that season, particularly by newcomers who are not yet acclimated. The disease is evidently of the simple catarrhal variety, usually accompanied by slight fever, with but little if any pain. Since March, 1904, I have made many microscopical examinations of the dejecta of both natives and Americans suffering from this form of dysentery without thus far finding the amœba dysenteriæ in any case that undoubtedly had its origin here in Baguio. The disease is, as a rule, self-limited and disappears after a few days of rest and proper diet. Some cases with considerable hemorrhage clear up completely within a week, presenting the characteristics of an acute congestion rather than of a specific disease. Exposure and chill appear to be the most common predisposing factors.

During the summer just past amœba were demonstrated in two of the surface springs in Baguio and during the rainy season I demonstrated amœba in one of these and in two other springs from which the natives are accustomed to drink. A circular dated May 1, 1904, was issued by me and generally distributed in and about Baguio, warning all persons that amœba existed in the surface springs and advising them to boil their drinking water as a precautionary measure. As stated above, my experience thus far has been that amœbic dysentery is unknown among the Igorrotes of this region, and I have not yet encountered a case among the civil employees and other Americans living in and near Baguio, though most of them take no precautions as to the sterilization of their drinking water. Among 55 microscopical examinations of feces made by me between March 1 and August 31, 1904, including Americans, Igorrotes, and Ilocanos, the 11 cases in which amœba were found were patients transferred here for treatment from Manila or other lowland towns.

It would appear from a consideration of the above facts that either the human host does not offer fertile soil for the development of amœba in these mountains or that the local amœba is of a nonpathogenic variety. The latter theory seems to me to be more in accordance with the facts because, as I have noted under another head, both

natives and Americans are especially susceptible to diarrhea and dysentery during the rains and it would seem that the amœba would find very suitable conditions for growth in the intestinal canal under such circumstances. That they are being swallowed every day in large numbers by all the natives and most of the Americans is practically beyond a doubt.

I trust that we shall be able to pursue this most important investigation of the prevalence and the pathogenicity of the local amœba during the coming season, with the cooperation of the bureau of government laboratories.

No amœba have been encountered thus far in the water from the Bued River spring which gushes from the face of a limestone cliff in quantity sufficient to supply a small city with drinking water. When the source of this spring has been properly protected and suitable pumping machinery has been installed we should have a water supply free from all suspicion.

It should be stated in this connection that the sanitarium has always taken careful precautions to furnish its patrons with sterile water. All drinking water is boiled on the kitchen range, under the supervision of a trained nurse and poured into covered earthen pots to cool. This is the simplest and most effective method of sterilization practicable in Baguio at the present time.

As to the effect of the Baguio climate in cases of amœbic dysentery, the number of such cases treated here during the past year has been so limited that it would be inadmissible to generalize from them. Our experience has been that the cases where treatment was begun early have, as a rule, responded promptly to the stimulus of the mountain climate. On the other hand, cases of long standing in which advanced pathological changes have occurred in the intestinal mucous membrane progress but slowly, as indeed they would in any climate. This latter class of cases is subject to relapses during the prolonged rains and mists of the rainy season.

Indigestion, gastric and intestinal, usually accompanied by diarrhea prevails during the rains, sometimes almost in epidemic form, but is not as severe or general among the native inhabitants as among the newcomers, especially Americans and Japanese. This condition and the catarrhal dysentery that prevails at the beginning of the rains I believe to have their main cause in the chilling of the surface of the body under the favoring circumstances of humidity and high altitude. Those who have lived for a long and continuous period in the lowlands are particularly susceptible and frequently suffer from indigestion for several days after arriving at Baguio, even during the dry season. The abrupt change from the tropic to the temperate days and the cool nights of the mountains greatly diminishes the functional activity of the skin and throws upon the renal and gastro-intestinal apparatus the main burden of excretion. This condition would form another factor favoring the developing of disturbances of the gastro-intestinal canal.

The functional derangements above described are strongly suggestive of the so-called "hill diarrhea" of India, though the symptoms do not agree completely with the symptom complex as described by the Indian military surgeons. This "diarrhea of altitude" is said to occur in the highlands of Europe and South Africa as well as in

India and an elevation of 6,000 feet or more with a very humid atmosphere are conditions said to be especially favorable to its development. Dr. Patrick Nanson in his well-known text-book on tropical diseases, states that in Simla, during the wet season of 1880, an epidemic of "hill diarrhea" affected from 50 to 75 per cent of the population, three-fourths of the cases occurring within a week of each other, and he further remarks that during the season few of the various hill sanitaria of India are without examples of the malady.

An epidemic of diarrhea and indigestion, with a few cases of catarrhal dysentery, occurred in Baguio at the beginning of the rainy season of 1904, affecting with especial severity the Americans and the recently arrived Japanese laborers. The distribution of the cases was so general, with such various water and food supplies, that only atmospheric conditions could satisfactorily account for the epidemic. It passed in ten days to two weeks, but sporadic cases occurred for a month or more. Numerous microscopical examinations of dejecta were negative in all cases.

Influenza is endemic in Baguio and two local attacks have occurred during the past year, the first during the winter months of January and February, when the cool northeast monsoon was blowing, the season when all diseases of the respiratory tract are most prevalent here. The second epidemic appeared during August, following a sudden change of winds to the northeast with clear weather, following three weeks of continuous rain.

The symptoms are ushered in by a chill, followed by fever and headache from one to three days, when the catarrhal symptoms of the respiratory tract supervene and continue, as a rule, for several weeks. There is considerable prostration during the acute stage of the disease and weakness and malaise continue for many days. Igorrotes, Ilocanos, and Americans are all afflicted, but the Americans appear to suffer least severely. The above symptoms justify a diagnosis of classical influenza, in my opinion, although the specific bacillus has not been isolated from the catarrhal secretions.

Malaria exists to some extent among the natives. As far as my experience goes, it is of the tertian variety and never pernicious in character. Occasional chronic cases are met with, with greatly enlarged spleens. I believe that the Igorrotes are usually inoculated during their visits to the lowlands, for I have not yet encountered a case of malaria which seemed to have originated in Baguio. Mosquitoes are present in such small numbers that this immediate region may be said to be practically free from them. The variety of the local mosquito has not yet been determined.

It is to be noted that persons who have previously suffered with malaria occasionally have a relapse within a few days after arriving here, due, no doubt, to the sudden change of altitude and temperature. The tendency of latent malaria to break out afresh under such circumstances is a well-known medical fact, and was exemplified on a large scale in 1899, when the United States troops returned home from the Cuban campaign.

Meningitis, cerebro-spinal, epidemic.—This formidable disease has occurred during the past five months in six Igorrotes treated in the sanitarium wards and the outdoor department, and, according to report, many have died of this disease in the camps of the Benguet

road. Three of my cases originated there and were brought to Baguio in a dying condition. The other three cases originated in or about Baguio. All the cases were clinically unmistakable, and in four of them the specific diplococcus was demonstrated in the spinal fluid obtained by lumbar puncture. The rainy season apparently predisposes to this disease, probably by the chilling of the surface of the body, to which the naked Igorrotes are peculiarly subjected. No case has come to my knowledge among the white or Ilocano population of the neighborhood.

The treatment has been of necessity expectant and unsatisfactory. Lumbar puncture afforded temporary relief in one case, and in another the relief was prompt and followed by rapid and uneventful convalescence without sequelæ. The disease as found among these mountain tribes retains practically unchanged the characteristics that distinguish it in other parts of the world. Obstinate vomiting, intense headache, restlessness, and delirium were present in all cases. Kernig's sign was present in all cases examined during the acute stage of the disease. No new foci of meningitis have appeared in Baguio. The noncontagiousness of the disease was apparent, native attendants, careless of precautions, sleeping near the patients for periods varying from a few days to several months without contracting the disease.

Parasites, intestinal.—The round worm and the tapeworm occur occasionally, but not commonly. I have not encountered the ova of ankylostoma in the fecal discharges of any natives of Baguio.

Rheumatism seldom occurs among the Igorrotes, and the only cases I have seen were among the well-to-do, who did not find it necessary to limit their supply of meat and fermented rice water as their poorer brethren must do. One case of inflammatory rheumatism with pericarditis occurred among the United States scouts, the patient being an Ilocano from the lowlands serving on the military reservation in Baguio. A case of chronic articular rheumatism occurred among the constabulary, the patient being an Ilocano. The winter season and the rainy season predispose to this disease.

Skin diseases are very prevalent among the Igorrotes of this province, as one would naturally expect from their nakedness and unsanitary habits. The most common skin disease is scabies, or common itch, which, through scratching, infection, and entire lack of cleanliness, sometimes assumes very severe forms, incapacitating the patient for work and causing much suffering.

Ichthyosis is common, and impetigo and seborrhea are frequently seen, the latter especially in children. Eczema is not uncommon, in rare cases affecting the soles of the feet.

Smallpox is endemic in Benguet, but, owing to the scattered and sparse population and the amenable character of the natives, can be easily controlled and in time stamped out. Baguio and the villages in its near vicinity have been frequently and carefully vaccinated.

Stomatitis, acute ulcerative.—This disease was observed in three Igorrotes during the early part of the present rainy season, and in the one fatal case it assumed a gangrenous form, destroying the soft palate and the adjacent tissues of the nose and pharynx. There was no membrane present in any case, but a deep obstinate ulceration of the buccal mucous membrane, with fetid breath. Anemia was marked in all cases. The predisposing causes of the disease are probably

PERSONNEL.

Several changes in the personnel of the sanitarium have occurred during the past year.

The attending physician and surgeon was absent on leave from July 15, 1903, until January 3, 1904, during which time Dr. L. H. Fales was detailed from the health department to perform the duties of the position.

Act No. 914, dated October 1, 1903, relieved the attending physician and surgeon of the duties of disbursing officer and property clerk, and provided that the dispensing clerk of the sanitarium perform such duties.

Mr. A. C. Shepard, dispensing clerk, having been in poor health for several months, was relieved from duty by Mr. Morton L. Monson on March 11, 1904. This change of disbursing officers was effected by Act No. 1081. which further provided that the disbursing officer of the Civil Sanitarium should act as provincial treasurer of Benguet until such time as a treasurer for the province should be appointed. It also amended Act No. 1049 by striking out the provision that the clerk of class 9 of the Civil Sanitarium should be a dispensing clerk.

Miss Ella Rist, nurse and housekeeper, resigned August 10, 1903, and the position was vacant until April 1, 1904, when Miss Marcella Doyle was appointed.

By resolution of the Commission, dated July 11, 1904, the appointment of an additional employee, class D, was authorized to take charge of the stable and horses at the Civil Sanitarium, and the position was filled July 25, 1904. This position was made necessary by the expansion of the livery department of the sanitarium, which now includes about 20 ponies and an equal number of equipments.

At the present date, September 1, 1904, the working force of the sanitarium consists of 1 attending physician and surgeon; 1 clerk, class 9 (who also acts as provincial treasurer and disbursing officer for other insular bureaus at Baguio); 1 nurse and housekeeper (absent in the United States); 1 nurse; 1 attendant, class D; 1 attendant, class D, on detail from the Civil Hospital; 1 stableman, class D; 1 cook (absent on account of illness); 1 assistant cook, and 5 muchachos.

Two Japanese coolies and 1 Igorrote stableboy are employed at present under the head of extra or "emergency" labor, the former devoting about half their time to improvement of grounds. Under the head of "Improvement of grounds," 4 Japanese laborers are constantly employed and varying numbers of Igorrote laborers employed according to the requirements of the work on hand.

During the busy months of April, May, and the first half of June, 1904, it was necessary to practically double the force of servants, during which months the number varied from 17 to 20. This expansion was accomplished by the provision for the hire of extra or "emergency" employees included in the appropriation for salaries and wages for the sanitarium, without adding to the regular pay roll.

The necessity for extra nurses and attendants was met by the honorable secretary of the interior, who, pursuant to Act No. 773, detailed employees of the Civil Hospital, Manila, for temporary service at Baguio. I take much pleasure in commending the work performed by these employees of the Civil Hospital and in expressing my

asthenia and damp cold. Two of the patients came from the same camp.

Tuberculosis.—Since my last report only two or three patients with pulmonary tuberculosis have entered the sanitarium, and they remained such a short time that no effect of climate on their condition could be noted. The fact that during two years' practice in this vicinity I have not yet seen a case of consumption among the native Igorrotes or Ilocanos would indicate at any rate that the disease is uncommon in this region, and indeed we should naturally expect that tuberculosis would find adverse conditions for development on a pine-clad plateau 5,000 feet above the sea, with a temperature cool and bracing, but at the same time equable enough to permit out-of-door life throughout the year.

I doubt, however, if it would be wise for the Philippine government to institute sanitarium treatment for American members of the Philippine civil service who have contracted pulmonary tuberculosis in the islands, for the principal reason that such patients should renounce all thought of further service in the archipelago. To effect a reasonably certain cure of the more favorable class of cases requires a long period of treatment, extending over many months, and possibly years.

In the occasional consumptive in whom the disease has progressed so far that debility makes the long sea voyage to the United States a serious complication, Baguio would offer pretty sure and prompt relief during at least nine months out of the year. The pure air of the highlands stimulates the appetite, improves nutrition, and increases strength. As to the rainy season, however, it is a matter of doubt whether tuberculous patients would not lose ground during the storms, cold mists, and all-pervading dampness characteristic of that time of the year, when there is a tendency, both among the natives and Americans, to contract influenza, bronchitis, and other obstinate catarrhal conditions of the respiratory tract.

Thanks to improved means of early diagnosis, advanced cases of tuberculosis do not often occur among the members of our civil service, and the few who are transferred to Baguio may with safety be treated temporarily in the isolation pavilion recommended for the treatment of other infectious and contagious diseases.

If wider experience in the treatment of consumptives in Baguio proves that the beneficial effect of our climate is continuous and not merely a temporary reaction to the stimulus of the cooler regions, the civil government will probably find it advantageous to erect an institution for the treatment of tuberculous Filipinos. A sheltered and sunshiny location in the mountains of southern Benguet would be desirable, near the lines of transportation, but far enough distant from the town of Baguio to effectively separate the communities.

Venereal diseases are practically unknown except in the "civilized" districts, and I have not yet seen a case among the Igorrotes. I have encountered a few cases of gonorrhea among the Ilocanos.

Yaws or frambœsia is an essentially tropical disease. I have seen three cases among the Igorrotes, all of them having the typical fungoid growths at the junction of skin and mucous membrane. In the cases noted the growths occurred at the corners of the mouth and at the edges of the nasal and anal orifices. All three Igorrotes were well nourished and apparently in good health at the time I examined them. As they belonged to a distant village I was unable to keep them under observation.

PERSONNEL

Several changes in the personnel [illegible] during the past year.

The attending physician and [illegible] July 15, 1903, until January [illegible] Fales was detailed from the health [illegible] of the position.

Act No. 914, dated October [illegible] cian and surgeon of the duties [illegible] and provided that the dispensing [illegible] duties.

Mr. A. C. Shepard, dispensing [illegible] several months, was relieved from [illegible] March 11, 1904. This change [illegible] Act No. 1081, which further provided [illegible] Civil Sanitarium should act as [illegible] such time as a treasurer for the [illegible] amended Act No. 1049 by striking [illegible] class 9 of the Civil Sanitarium [illegible]

Miss Ella Rist, nurse and [illegible] and the position was vacant [illegible] Doyle was appointed.

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At the present date, September [illegible] sanitarium consists of 1 attending [illegible] class 9 (who also acts as provincial [illegible] other insular bureaus at Baguio [illegible] the United States); 1 nurse [illegible] D, on detail from the Civil Hospital [illegible] (absent on account of illness [illegible]

Two Japanese coolies are [illegible] present under the head of [illegible] devoting about half their [illegible] the head of "Improvement of [illegible] stantly employed and varying [illegible] according to the requirements [illegible]

During the busy months of [illegible] 1904, it was necessary to [illegible] ing which months the number [illegible] was accomplished by the [illegible] gency" employees included [illegible] for the sanitarium, without [illegible]

The necessity for [illegible] honorable secretary of the [illegible] detailed employees of the [illegible] ice at Baguio. [illegible] formed by these [illegible]



[illegible] able [illegible] ided [illegible] feet. [illegible] in road [illegible] d on the [illegible] r all, with [illegible] The lower [illegible] dormitory [illegible] persons when [illegible] ed into seven [illegible] building is [illegible] sanitarium and

appreciation of the excellent character of the empoyees chosen for this detail by the attending physician and surgeon of the Civil Hospital.

I also commend most highly the zeal and the good work of the regular employees of the sanitarium who, for several weeks during the high pressure of the busy season, worked cheerfully, without regard for hours, and, in some cases, without regard for health or comfort.

SUBSISTENCE.

During the past year there has been a noticeable increase in the variety of fresh fruits and vegetables brought to Baguio for sale by the natives, and the important question of subsistence for our growing American community is much simplified. The natives living within a radius of several miles from Baguio are learning about the demand for such food, and the way that they are attempting to meet it by increasing their crops and adding to the variety of their produce augers well for the future prosperity of the province as well as the comfort of the Americans. Natives come almost daily laden with camotes, fodder rice, coffee, or bananas for sale. At the date of writing (August 19) excellent Irish potatoes and delicious mangoes from the valleys of Antimok, Itogen, and Ambuklao are being brought into Baguio in much larger quantities than can be sold. Cucumbers and salad ferns are now in season, and for several months in the year tomatoes, pease, beans, and cabbage are offered for sale by the natives. The Igorrote has not yet learned the culutre of chickens on a large scale, but the Ilocanoes from the neighboring towns of La Union and the lowlands of Benguet are bringing more chickens and eggs than ever before.

The agricultural station at La Trinidad added much to the supply of fresh vegetables of the community during the past season by supplying a large quantity of cabbage, radishes, squash, carrots, and beans, all of excellent quality. It is hoped that the station will be able to furnish forage for the sanitarium stables during the coming season, thereby reducing considerably the expense of that department of our institution.

The civil supply store furnishes us with a greater quantity and a larger variety of commissaries than ever before.

It will appear, therefore, that the diet question is much more satisfactory than it was a year ago, and we may confidently expect a solution of the problem by the early part of the coming year, when the milch cattle ordered several months ago from the United States should have reached here.

I have included in my estimate of repairs and additions submitted to the insular architect an item for a commodious pine chicken house, and as soon as this is erected shall undertake to raise chickens on a scale commensurate with the needs of the sanitarium. The Chinese calves transferred to the sanitarium from the serum laboratory about a year and a half ago have been grazing ever since in the hills east of Baguio, and have thriven remarkably. They have grown large and plump, and their coats are as smooth and soft as those of our Jersey cattle in the United States. As they are not suitable for milking purposes we propose to use them for beef during the coming season.

IMPROVEMENT OF GROUNDS.

For the past few months this department has been under the able management of Mr. Will Jessup, of the bureau of agriculture, and, in spite of long periods of heavy rain, a good deal of work has been accomplished. Paths have been graded, the grounds about some of the cottages improved by sodding, terracing and planting native ferns, flowers, and shrubs. The Japanese laborers secured for this department of sanitarium work have shown much taste and a peculiar capacity for landscape work. Before the end of the rains we expect to have finished a good deal of transplanting of decorative shrubs, and we already have the nucleus of a good collection of orchids. For the protection and care of these Mr. Jessup is planning an arbor or grotto to be located in the shallow ravine just south of the main building. In time this can be made an instructive and beautiful feature of the sanitarium, inasmuch as numerous varieties of this interesting flower may be found abundantly in and about Baguio.

It will be necessary to lay new tennis courts, as the present one will be occupied by the proposed addition to the main building of the sanitarium.

The artificial pond has been finished and already adds a pleasing item to the landscape. One corner has been dredged to such a depth that it may be used as a swimming pool for at least eight months out of the year. Borders and islets are being planted with shrubs and flowers, and minor details are planned, such as the placing of rustic seats and the erection of a small rustic bridge.

BUILDINGS.

During the past year two buildings have been added to the sanitarium group that will increase our capacity considerably during the busy season, namely, the office building of the Commission, which will leave cottage No. 1 free for occupancy as a dwelling, and the building for servants' quarters, which will do away with tents and the unsightly outhouses hitherto required for quartering servants and laborers.

The office building is located on high ground, just east of cottage No. 3, and commands a fine view of the country to the north and east of Baguio. The material is native pine, with mansard rubberoid roof, and the dimensions are 28 by 43 feet. The first floor comprises one large office, 28 by 29 feet, and two smaller offices, 14 by 16 feet, the large office containing a spacious fireplace of Baguio brick, a material which I am glad to report it has been found practicable to make in this immediate neighborhood. The second floor is divided into one office, 28 by 24 feet, and a telegraph office, 16 by 28 feet.

The building for servants' quarters is located near the main road a few hundred yards north of the sanitarium, in open ground on the hillside. It is a spacious pine building 28 by 75 feet over all, with mansard rubberoid roof, and entrance 14 by 8 feet. The lower floor is divided into kitchen, mess room, and a large dormitory (with brick fireplace) capable of accommodating 75 persons when all the bunks are built in. The upper story is divided into seven rooms, and should accommodate 50 persons. This building is intended to house not only the servants of the sanitarium and

cottages, but also the gangs of carpenters, laborers, and carriers employed here on Government works.

The stable has been completed, and now forms a comfortable shelter for a maximum of 43 ponies. Without this building we should doubtless have lost a large proportion of our stock during the severe typhoon of June to July, 1904, when, I am informed, 16 ponies perished out of one herd in the Trinidad Valley.

Rooms were added to the lower stories of cottages Nos. 2, 4, and 5, and separate structures to be used as kitchen and servants' room were built adjoining those cottages and connected with them by a covered passageway. These additions have greatly increased the capacity and desirability of the three cottages mentioned. The rental has been increased proportionately to the cost of the additions.

The addition to the main sanitarium building authorized by the Commission more than a year ago will almost double the capacity of the institution and, by offering a number of double and single rooms for rental, will add much to the comfort of patients and guests. Plans have long been prepared, and the intention of the bureau of architecture is to begin the work of construction within a few weeks from the date of writing, when the rainy season will be past and an adequate supply of lumber should have been delivered. This addition will be two stories high, continuous with the south end of the sanitarium, and built in the form of a cross to secure a maximum of sunlight. It will contain 8 single and 15 double rooms for patients and guests, and there will be storerooms, baths, and toilets for each floor. The lower floor will be several feet above the level of the ground, with ventilation underneath in order to secure a minimum of dampness during the rainy season. In order to keep pace with the increased number of guests and patients, a new kitchen will be built directly east of the main building, connected with the latter by a covered passage, and the present kitchen and storerooms connected with it will be converted into a large dining room opening onto the western veranda.

By resolution of the Commission, dated May 3, 1904, a pesthouse for Baguio was authorized at a cost not to exceed 880 pesos. It will be erected at the end of the present rainy season, when lumber and labor are available. This building will make it possible to isolate and properly shelter and treat the contagious and infectious diseases constantly occurring among the native laborers and the troops of carriers that pass to and from Baguio.

In a communication dated July 1, 1904, I reported to you the inadequacy of the rubberoid roofing material in use on all the sanitarium buildings excepting the stables. Our roofs have always leaked badly, but the prolonged and severe rain storms of June and July, 1904, penetrated every weak spot in the roofs, soaking ceilings and woodwork, and causing much discomfort among the occupants of the sanitarium and cottages. It is important that the new buildings soon to be erected should be roofed with a more durable and useful material, such as shingles or galvanized iron. In this connection I am informed that a shingle mill is soon to be erected in Baguio by private capital.

The accompanying table of Baguio weather statistics for the year beginning September 1, 1903, I have condensed from meteorological data furnished me by courtesy of the local observer, Gregorio Galvan.

The highest official temperature registered at this station during the year was 77.7° F. on April 5, 1904, and the lowest was 49.8° F. on January 6, 1904.

The highest monthly average or mean maximum temperature was 74.1° F. for April, 1904, and the lowest or mean minimum temperature was 52.5° F. for February, 1904.

There were 201 days during which rain fell, and the rainfall for the twelve months reached the phenomenal total of 195.56 inches, as compared with 96.29 inches for the same period in 1900–1901.

The highest monthly rainfall was 54.92 inches in July, 1904, and the lowest 0.81 inches in March, 1904.

The maximum rainfall in twenty-four hours occurred October 26, 1903, with a deluge of 19.82 inches. Two other days of exceptional rainfall were July 12, 1904, 15.5 inches, and June 25, 1904, 15.31 inches.

TABLE E.—*Baguio weather statistics, September, 1903, to September, 1904.*

Date.	Number of rainy days.	Monthly rainfall.	Maximum rainfall in 24 hours.	Number of foggy days.	Temperature	Maximum temperature registered during month.	Minimum temperature registered during month.	Mean maximum monthly temperature.	Mean minimum monthly temperature.
1903.		*Inches.*	*Inches.*		° *F.*	° *F.*	° *F.*	° *F.*	° *F.*
September	29	19.29	1.70	5	75.7	75.7	60.1	72.7	61.9
October	23	30.24	19.82	7		75.2	58.3	70.2	61.1
November	10	9.29	4.92	6		76.1	52.7	72.0	58.7
December	12	2.16	.61	3		74.7	54.0	67.6	56.2
1904.									
January	9	3.46	1.09	7		74.5	49.8	63.9	56.2
February	10	1.20	.26	5		75.2	50.0	71.3	52.5
March	5	.81	.36	10		76.1	51.8	73.6	55.6
April	8	3.70	.78	10		77.7	52.2	74.1	56.9
May	18	8.73	1.47	11		75.9	56.3	69.8	59.8
June	25	39.64	15.31	8		72.7	57.2	69.4	60.4
July	23	54.92	15.50	5		71.6	55.4	66.6	59.2
August	29	22.12	5.43	9		71.6	58.1	65.9	60.0
Grand total	201	195.56		86					

RECOMMENDATIONS FOR PAVILION HOSPITAL.

I had the honor to submit for your consideration last December certain recommendations and plans pertaining to the erection of a pavilion hospital at Baguio, and as our experience during the past six months has strongly emphasized the necessity for such a hospital connected with the sanitarium, whereby guests and patients may be completely separated, I take this opportunity to repeat my recommendations in part.

The lower floor of the main building of the sanitarium is within a few inches of the ground, and is consequently too damp to be occupied as sleeping or living rooms or offices. The second floor, though several of the rooms are insufficiently lighted, is in the main comfortable and suitable for occupancy by persons in good health and by convalescents. But the building was not designed as a hospital, and therefore lacks most of the qualities desirable in a modern hospital building, particularly in respect to the operative and surgical departments and the segregation of the sick. In any event

it must soon expand to meet the growing requirements of a large summer health station.

As soon as transportation from Dagupan to Baguio becomes easy and fairly rapid, the sanitarium will at once become the natural goal for a large class of patients suffering from subacute and chronic diseases that would incapacitate them for the long and somewhat laborious journey necessitated by present conditions of transportation. Patients desiring surgical treatment and women awaiting confinement will doubtless soon appreciate the great advantages of pure air and stimulating climate offered by Baguio, and we shall need to be prepared to offer such patients the best facilities for the treatment of their various conditions. To meet these growing needs a new group of buildings should be erected at a considerable distance from the present sanitarium, on open or slightly shaded ground and with plenty of room for expansion. In localities where reasonable land values obtain, the pavilion plan of hospital is much to be preferred, on account of the greatly increased building surface that may be reached by sunlight, on account of better ventilation and of the possibility of a more complete dissociation of the various departments of the institution.

Orientation.—Probably the first requisite for a salubrious hospital is an abundance of sunlight. Walls, grounds, roof, and a maximum proportion of the interior should be reached by the direct rays of the sun for the greatest possible share of each day. The bactericidal action of the sun's rays is now a matter of daily demonstration in our biological laboratories, and the value of sunlight as an enemy of disease is a matter of common knowledge. In forming the plans of any hospital most careful study should be directed to secure a maximum of sunshine. Such care is especially necessary in Baguio, where the high altitude puts an additional chill into the shady side of things during the hours of early morning and late afternoon, and where the rainy season is usually a time of protracted downpours, surpassing in rainfall even the storms of the tropical lowlands.

A southern exposure will be found more desirable in Baguio as it is in more northern latitudes, and a longer yearly average of sunshine will be gained from an eastern than from a western exposure, from which latter direction the majority of mists and rain storms blow up from the China Sea. The sun is thus clouded for a portion of the afternoon, varying with the different periods of the rainy season; but, on the other hand, there are few mornings during the year, even in the rainy season, when the sun does not shine in Baguio for an hour or two.

Ventilation and heating.—These two important features of a wholesome hospital may be attained easily, owing to conditions of climate and an abundance of good firewood. The open grate is generally accepted as the most perfect ventilator and the most pleasant form of heating apparatus. In northern countries it must, however, be supplemented by furnace heat, but in Baguio, where the thermometer seldom falls below 50° F. during the cool season, the grate will furnish ample heat.

Building materials.—These will have to be selected with a view to using the materials at hand, and in accordance with the limitations imposed by the distance of Baguio from the market and the consequent cost of transportation. If possible, the buildings should be

erected with a view to permanency and, particularly, to resist fire. To obtain such permanent properties brick and plaster would be the ideal material, or, possibly stone could be used. If, on account of the possible destructive effect of earthquakes, it should be deemed inadvisable to employ these materials, possibly a combination of wooden framework and brick filling could be devised by the architect that would afford the necessary elasticity, together with sufficient resistance to fire. An extensive bed of clay, thought suitable for the manufacture of brick, has been discovered recently in the immediate vicinity of the sanitarium, and at the date of writing one or two batches of apparently serviceable brick have been turned out. The product is thus far experimental, but there seems to be no reason why a good quality of brick should not be manufactured here in Baguio, obviously an important aid toward securing greater economy and permanency of construction of our public buildings. If, for any reason, the use of brick in the construction of the hospital buildings is found to be impracticable, the choice of a building material will narrow itself to that of the native pine. This should be thoroughly seasoned and the interior surfaces should be planed smooth for paint or oil finish. The floors should be carefully laid to avoid cracks, and all unnecessary interior projections or irregularities of construction that tend to collect dirt and to make cleanliness more difficult should be avoided.

Buildings.—A convenient arrangement is to have the administration building located in the center of the group, planned to include offices for the surgeon, superintendent, and clerks, a drug room and dispensary, storerooms of ample size for medical and commissary supplies, a large dining room for patients, and a small one for attendants. The kitchen should be in a separate building, connected with the dining room by a small passageway. The floor of the kitchen should be of cement or glazed brick, and should slope toward a central drain. Door and window screens of wire netting are desirable for dining room and kitchen during the fly season. A part of the administration building might be used for quarters of the superintendent and attendants.

Medical pavilion.—A pavilion for medical cases should be located on one side of the administration building, connected with the latter by a long, covered passageway that could be designed as a sun parlor and promenade for convalescents. Possibly a solarium built into the sunniest side of each pavilion would be more feasible from the architect's standpoint. This pavilion should be divided into wards for men and women, and should include a few private rooms for medical cases. It should be constructed with a view to easy extension. In my opinion small wards, capable of accommodating four to six persons, are preferable to the large wards, on account of the greater degree of privacy thus obtainable and the greater facility in setting apart patients suffering with severe or offensive illnesses or illnesses of such a nature as to disturb the other patients. This pavilion should also include a small diet room, a retiring room for the nurse in charge, a laboratory for microscopic and other diagnostic work, and, connected with the latter, an autopsy room or morgue.

Surgical pavilion.—This pavilion may be located on the opposite side of the administration building and connected with it by a long sun corridor like that of the medical pavilion. Like the latter, it

should contain private rooms and wards for men and women. The private rooms of the surgical pavilion will serve well for the accommodation of maternity cases, at least for the present. The demands of the future will probably justify the construction of a separate maternity. One small ward for each sex and four or five private rooms would probably afford ample accommodation for all surgical and confinement cases likely to apply for treatment at the sanitarium in the near future. There should be also included a diet room, a retiring room for the nurse, and a reception room for the treatment of minor surgical accidents, the application of surgical dressings, etc. The surgical pavilion should include the operating room, the final plans for which need to be worked out with much particularity of detail. There are, however, certain general principles of construction that may be here stated. The lighting should be ample, preferably from the north. A sufficient portion of the north side of the room should be of glass, starting from about 3 feet above the floor, vertical for about 3 feet more, and then sloping back at an angle of 60° until it meets the ceiling. Such an arrangement makes it possible to place the operating table close under the light, thus gaining a most effective illumination of the field of operation. The floor and walls should be, so far as possible, nonabsorbent and easily cleaned. For the walls, hard plaster, painted with enamel paint, would be preferable, but if the use of plaster is impracticable a smooth-finish pine interior, painted with enamel paint, would make a satisfactory substitute. The best material for the floor would be cement or glazed brick. Even the best laid wooden floors soon present cracks that lodge the dirt and seriously complicate the problem of securing surgical cleanliness. Connected with the operating room should be a small anesthetizing room, a room for the sterilization and storing of instruments and dressings, and a washroom and dressing room (preferably with bath) for the operating surgeon and his attendants.

Isolation pavilion.—It is most important that we should have an isolated building where we may segregate patients suffering with infectious and contagious diseases, or where suspects may be kept awaiting the development of their disease. There should be a small ward for medical cases, one for infected surgical cases, and a third and larger ward for venereal cases; also a diet room, nurses' room, a small dining room for venereal cases, and one or two private rooms. The interior should be susceptible of easy and thorough disinfection.

Lavatories and water-closets.—A lavatory and bath room will be necessary for each side (male and female) of each pavilion. The following recommendations of Dr. Henry M. Hurd, superintendent of the Johns Hopkins Hospital, are appropriate:

> The lavatory and water-closet should be in a projection of the building, if possible with an open-air cut-off between the latter and the ward, and the two rooms, to avoid confusion, should be entirely separate. The bath rooms should be adjacent to the lavatory. There should also be a slop room containing sinks for emptying and washing utensils, a linen room, and a storeroom for patients' articles.

Air space.—According to Mr. Ernest Flagg, the minimum air space per patient generally prescribed is 100 square feet, or 1,200 cubic feet, but many think it should be much more. One of the highest French authorities prescribes an average of 56 cubic meters (about 1,500 cubic feet), and in Italy they allow ordinarily 75 cubic meters per bed, and sometimes as much as 100 cubic meters. In Baguio, where the

mild climate permits of open doors and windows during a large portion of the twenty-four hours, and the open grate affords an ideal means of ventilation, I believe that 1,200 cubic feet of air space would be an ample allowance for each patient. However, as the allowance can not be too great, it may be increased to the limit allowed by proper economy of construction.

Laundry.—A small laundry, with cement or brick floor, should be built in the neighborhood of pavilions, in a secluded spot if possible. For purposes of economy of construction, it may be found desirable to connect it with the kitchen.

Nurses' quarters.—Detached quarters for the female nurses will add greatly to their comfort and privacy and to the efficiency of their work. Those who spend their working hours among the sick need to be completely separated from them during the hours set apart for rest and recreation. I would recommend that a suitable cottage, with single living rooms, sitting room, dining room, and kitchen, be erected to serve as quarters for the female nurses. Their number is small at present, but soon must be increased considerably to meet the requirements of the growing sanitarium.

Very respectfully,

J. B. THOMAS,
Attending Physician and Surgeon.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

APPENDIX H.

REPORT OF CHIEF OF THE BUREAU OF FORESTRY FROM SEPTEMBER 1, 1903, TO AUGUST 31, 1904.

MANILA, P. I., *August 31, 1904.*

The SECRETARY OF THE INTERIOR,
Manila, P. I.

SIR: I have the honor to submit herewith a report of the work of the bureau of forestry for the period from September 1, 1903, to August 31, 1904.

The year has been marked by the accomplishment of several important factors in the betterment of the forest service. The "forest act" was promulgated by the insular Civil Commission May 7, 1904, and by means of its wise provisions a rational system of forest management can be inaugurated and the future welfare of the forests be secured. It received careful scrutiny from the legal minds connected with the law-enacting branch of the civil government, with a view to protecting and conserving the rights of the humblest licensee while granting to lumber companies and heavy individual investors considerable latitude in timber operations.

The visit of Mr. Gifford Pinchot, chief of the United States Bureau of Forestry, to the Philippines resulted in much benefit to the forest service, due to his assistance in preparing the present "forest act."

The requirements of the "forest act" having changed, it became necessary to revise the Forest Regulations, and a Forest Manual, containing both "forest act" and "forest regulations," indexed and annotated, with extracts from other laws bearing upon forest revenue or service and some additional notes, was compiled and gratuitously distributed to all forest officials and licensees. The publication is of convenient pocket size, with leather cover and inside flap, and in this latter is inserted each license as issued. Among forest officials having charge of money and property accounts it was deemed prudent to distribute a similar-sized publication, giving specific instructions for uniform and systematic returns, and this was likewise prepared and issued by the bureau.

In the "forest act" several important changes may be noted, which it is confidently hoped will give an impetus to forestal development. Not the least of these is the reduction of the tariff on forest products of about 35 to 60 per cent; the rearrangement of the native woods into four groups; elimination of a "superior group" (a classification in continual conflict with "first group"); the adoption of the metric system of weights and measures, in conformity with the United States Revised Statutes and with similar action on the part of most advanced nations; the division of the provinces into two

classes, A and B; and granting of licenses for a period within the discretion of the secretary of the interior and chief of the bureau, for a period not to exceed twenty years.

The liberality of these provisions may be seen at a glance, especially the first and last. In dividing the provinces encouragement to licensees has governed action. The provinces in class "B" are those in which it is desirable that the larger timber operations be carried on, and provision is also made for exclusive license where the party at interest will have sole privilege of gathering a certain forest product on the area of public forest designated. The tax on beeswax, honey, diliman, wood for shoes, and orchids has been repealed.

It is cause for congratulation that at every step the Civil Commission has been in thorough sympathy with a rational forest policy. This is further shown by the "public land act" (926), which provides that public woodlands shall not be entered, sold, or leased until a certificate is received from the bureau of forestry that the land is more valuable for agricultural than for forest purposes. The removal of valuable timber from leased land is also subject to regulations of this bureau.

Much time was consumed during the first half of the fiscal year by the foresters and workshop in preparing the exhibit for the Louisiana Purchase Exposition at St. Louis, Mo. Due to the lack of transportation facilities in all parts of the islands, the exhibit gathered represents a vast amount of very trying work by the few men engaged in it. The workshop, but recently organized, was without woodworking machinery, fine oils, and varnishes, all of which had been ordered from the United States, but not received.

During the first part of the year a forest map, 16 by 13 feet (scale, 6 miles to the inch), was made of the Philippine Islands by the draftsmen of the bureau. The forest, cultivated and uncultivated areas, were shown in different colors, and the various forest stations and district headquarters were also indicated. This map was sent to the exposition at St. Louis and a copy one-half the size of the original was made for use in this office. Forest maps of five forest districts, comprising the provinces of Bataan, Zambales, Tayabas, Ambos Camarines, Mindoro, and Masbate have been made in detail, and the limit of public forest granted to each holder of a timber license shown thereon. Forest maps of nine other provinces have been made in less detail, and in time forest maps, on a uniform scale, will be made of all provinces. Copies of maps, such as the above, are sent to forest officials for their information and for any additional notes and corrections which they may be able to make. By this means the bureau will make substantial and valuable additions to the knowledge of the location and value of Philippine forest resources.

The additional force authorized during the past year consisted of 1 civil engineer, at $2,400 per annum; 1 inspector, at $2,000 per annum; 4 assistant inspectors, at $1,400 per annum; 1 clerk, at $1,200 per annum; 1 skilled workman, at $900 per annum.

On August 31, 1904, the authorized force was: One chief of bureau, 1 assistant chief, $3,000; 6 foresters, $2,400; 1 inspector, $2,000; 4 inspectors, $1,800; 2 clerks, $1,800; 1 clerk, $1,600; 1 engineer, assistant, $1,400; 4 assistant foresters, $1,400; 5 employees, $1,400; 3 assistant inspectors, $1,400; 6 clerks, $1,200; 4 assistant inspectors, $1,200; 1 skilled workman, $1,200; 4 clerks, $900; 6 assistant

inspectors, $900; 1 skilled workman, $900; 4 assistant inspectors, $720; 4 clerks, $600; 13 rangers, $600; 8 skilled workmen, $480; 40 rangers, $420; 2 draftsmen, $360; 6 skilled workmen, $360; 6 clerks, $300; 75 rangers, $300; 12 skilled workmen, $240; 1 laborer, $180; 5 laborers, $150; 3 messengers, $150; 1 laborer, $120.

During the past year the following changes have been noted: Eighty-six appointments, 48 promotions, 30 resignations from bureau, 28 transfers from bureau (includes launch crew), 15 transfers to bureau, 5 deaths, 38 removals from bureau.

Eleven persons were given temporary appointments in the bureau for periods ranging from one day to five months. Four of these employees were Igorrotes, employed during the dry season as fire wardens in the pine region of Benguet Province.

A civil-service examination was held in the United States in April, 1904, for positions in this bureau. Fourteen eligibles signified willingness to enter this service, and a cablegram was sent to the Chief of the Bureau of Insular Affairs to select 8 eligibles for the following vacancies: Two foresters, at $1,800 per annum; 4 assistant foresters, at $1,400 per annum; and 2 assistant inspectors, at $1,200 per annum.

The "appropriation act" for the fiscal year 1905 necessitates a reduction of 24 rangers; 4 additional assistant foresters were authorized.

The launch *Philadelphia* was assigned to this bureau in October, 1903, and was of great assistance in reaching places far from the points usually visited by coasting steamers. The launch, however, was not suitable for distant sea trips during the typhoon season, and has recently been transferred to the board of health. The undersigned hopes that sometime in the future a coast-guard cutter will be assigned to this bureau for the use of its foresters and inspectors.

DIVISION OF INSPECTION.

The personnel of the division of inspection consists of 3 inspectors, 12 assistant inspectors, 10 first-class rangers (formerly designated as assistant foresters), 40 second-class rangers, 69 third-class rangers, and 7 clerks, being an increase over last year of 1 inspector, 1 assistant inspector, 1 first-class ranger, 11 second-class rangers, and 19 third-class rangers. Two assistant inspectors who were in charge of the Manila dispatching office on August 31, 1903, are now performing duty in the field, having been relieved by 2 clerks. During the past year the difficulty in securing natives for duty in the provinces has considerably diminished.

The following changes in forest stations have been made:

STATIONS ESTABLISHED.

Station.	Province.	When established.
Alaminos	Pangasinan	Dec. 21, 1903
Calauag	Tayabas	Jan. 18, 1904
Cervantes	Bontoc	July 21, 1904
Duet	Camarines	Jan. 20, 1904
Goa	do.	Jan. 24, 1904
Hermosa	Bataan	Nov. 28, 1903
Pasacao	Camarines	Mar. 3, 1904
Tagbilaran	Bohol	May 15, 1904
Unisan	Tayabas	Jan. 1, 1904



BUILDING A ROAD THROUGH FOREST NEAR ATIMONAN, TAYABAS.

STATIONS TRANSFERRED.

Station.	Province.	Date.
Norzagaray to Angat	Bulacan	Nov. 21, 1903
Orani to Balanga	Bataan	Nov. 27, 1903
San Isidro to Cabantuan	Nueva Ecija	June 21, 1904
Lagatic to Capiz	Capiz	July 4, 1904
Bacolor to Guagua	Negros Occidental	Feb. 12, 1904
Santa Cruz to Iba	Zambales	do.....
Iba to Masinloc	do.....	Mar. 10, 1904
Jolo to Bongao	Jolo	Nov. 7, 1903

STATIONS ABANDONED.

Bongao	Moro	Mar. 4, 1904
Isabela	do.....	Oct. 12, 1903

The use of the metric system, instead of the Spanish measure, will materially decrease the work of appraising the government charges on timber.

A uniform inspection of forest stations has been inaugurated by the introduction of a form containing thirty-one questions. This report keeps the central office in close touch with the work of each forest station. The first part informs when and by whom station was last inspected, and the last station inspected by the officer rendering the report, as well as the date of his last inspection. There follows the reporting officer's itinerary from the date of his last inspection to the date of the one he is reporting. A number of questions are devoted to outside inspections, and from the answers the central office may easily learn with what degree of efficiency the ranger has patroled the municipalities within his jurisdiction, as well as to what extent he has required the payment of government charges on forest products gathered with and without license. The remaining questions are relative to the manner in which the four registers, i. e., licenses, letters, manifests, and daily operations are kept, and the condition of the files, etc. The last part of the report is grouped as follows: 1, Character of each employee at station; 2, needs of station; 3, conditions throughout territory subject to station, forest fires, places where cuttings should be prohibited, etc.; 4, investigated under special instructions; 5, recommendations; 6, other remarks.

The reports now on file in this office testify to the satisfactory manner in which the documentary work at the various forest stations has been performed during the year.

All manifests of the last issue were numbered serially by the public printer, and the rangers in charge of stations held accountable for the numbers sent to their station. They were printed in triplicate. The original is for delivery to the owner of the forest product, the duplicate for transmittal to the central office, and the triplicate for the files of the station.

The forms for reappraisement of timber at destination, orders of payment and orders of discharge are also numbered serially, and forest officers are charged with numbers received and required to account for same.

During the past year inspectors and assistant inspectors have,

when practicable, spent not over one-sixth of their time at headquarters attending to correspondence and office work, devoting the remainder to inspecting other forest stations and various municipalities of their districts.

This office keeps two cards for each station, containing the following data:

Card No. 1.—Name of station, date station was opened, employees on duty thereat and dates of their arrival, relief or departure; name of officer in charge, dates inspected, names of officers making inspections, and amounts of government charges collected, by months, on timber, firewood, and other products originating within the jurisdiction of the station.

Card No. 2.—A tabulated list of the municipalities in the station's jurisdiction, the number and class of licenses granted in each municipality, and notations opposite said towns of the inspections of the municipalities made monthly by inspectors, assistant inspectors and rangers. Officials in charge of districts keep this office advised as to the frequency with which the various municipalities of their respective districts should be inspected. This information is also duly entered, so that in addition to the reports of inspection of a forest station, these cards show at a glance the work accomplished by each station.

Instructions defining the duties of the municipal presidents, as provided by section 31 of the "forest act," have been prepared, and it is hoped the cooperation of the municipal officials with forest officers will be of considerable value in the way of authenticating manifests, reporting unauthorized forest operations, and restricting the making of "caiñgins" (clearings of public woodlands by fire for agricultural purposes) to land not valuable for forest purposes.

There were over 27,000 lots of forest products officially manifested since August 31, 1903.

The following is a comparative statement of government charges collected on forest products for the fiscal years 1902–3 and 1903–4.

	1902-3.	1903-4.	
	Mexican currency.	*Philippine currency.a*	*Mexican currency.*
July	$41,318.61		$74,311.26
August	24,930.23		43,441.72
September	34,599.59		50,253.66
October	45,221.54		45,896.38
November	37,202.90		46,213.59
December	46,000.79		56,361.17
January	42,593.52	P31,228.50	
February	35,340.13	41,668.56	
March	52,536.42	49,389.29	
April	47,778.12	43,795.61	
May	55,632.52	44,230.06	
June	64,300.48	42,747.63	
		b253,057.65	=283,002.80
Total	527,414.85		599,480.58

a Government charges on forest products were assessed in Mexican currency until January 1, 1904, on which date Act No. 1032 became effective, providing that all public dues * * * forest taxes * * * be assessed and collected in Philippine currency and at the same amounts as had been theretofore fixed by law in Mexican currency.

b P253,057.65 reduced to Mexican currency, at the average official rate of exchange during that period, equals $283,002.80.



PRIMITIVE LOGGING RAILROAD IN THE CUTTING DISTRICT OF THE ALVISEE LUMBER AND DEVELOPMENT COMPANY, SOUTHEAST COAST OF MINDORO.

RECORDS.

The "card-index" system is used and affords a systematic record. Papers relating to any one subject can be readily obtained. As official papers pass from each division they are initialed by party dictating, copying, translating or checking same, and are not filed unless properly stamped.

Outgoing mail, without reservation, passes over the chief's desk, and, if satisfactory, is initialed.

The offices of the bureau were moved during the last days of May from the "Intendencia" building to the "Oriente" building. The new quarters are more commodious and satisfactory than those formerly occupied.

DIVISION OF FOREST MANAGEMENT.

The work of the division of forest management during the first half of the year was mainly confined to examination of forest areas assigned to various licenses, and the marking of timber for felling within the same. Due to the small force available for this work, the ground covered was necessarily small, and work of the above nature was confined to five forest districts, comprising the provinces of Zambales, Bataan, Tayabas, Ambos Camarines, and Masbate. In marking, an attempt was made to limit the cutting of superior and first-group woods, and in all cases where it would not prove to be too great a financial burden upon the licensee, the removal of a certain per cent of inferior woods was required.

It is only by some method of selection, by competent forest officials, that the forest conditions of the islands can be improved, since to allow the indiscriminate cutting of the better-grade woods would soon cull the forests of desirable species and leave the same composed only of trees of inferior classes, which have but little market value, and which in many cases, due to the heavy transportation charges, can not be put upon the market except at a loss.

In places where much cutting has been done in the past and where certain species are liable to extermination under present lumbering methods, the felling of such species may be prohibited for a certain length of time, or the amount cut curtailed for a period of years in order that the forest may have an opportunity to again recover.

The forests of these islands are unlike those usually found in temperate climes, in that no one species, excepting the genus *Pinus*, is gregarious, that is, found in pure stands. The general rule is that on any one acre a great variety of tree species, 8 inches and over in diameter, are found, with but few members of each species represented. Such forests are naturally operated as "selection" forests, that is, forests in which clear cutting does not take place, and the lumberman seeks for cutting desirable trees which he finds scattered here and there. Such trees are usually those of middle diameters, from 24 to 40 inches, thus leaving in the forest only young trees, too small to cut, and overmature trees which are generally defective and which should have been the first ones removed as the timber in the same becomes less valuable each year. The seeds of these old trees, the source of reproduction, generally do not produce as vigorous seedlings as do seeds from trees in the prime of life. Under the native methods of lumbering

after the felling of the medium-size trees of the desirable classes, we generally find left on each acre a great number of trees which are of little merchantable value at the present time. These present a serious difficulty in that these trees frequently bear a greater amount of seed, and at an earlier age, than do trees of the better species. In marking and selecting trees for felling the forester attempts to avoid the above bad effects of cutting by insisting upon the removal of as much of the poorer grades as possible and attempts to aid the reproduction of the better species in every possible way.

As marking the beginning of lumbering operations in the islands along rational forestry lines, the work of the Iloilo Electric Company in Negros Occidental is of interest. This company has erected a mill on the Gimogan River in the above province, and also has a wire-cable logging outfit in the forest on the same river. The operations of this company were inspected during January, 1904, and though they had temporarily suspended operations, enough work had been done up to the time of the inspection to prove the feasibility of the project.

MILL.

The company at the present time has a mill (capacity 20,000 feet B. M. per day) 7½ miles from the mouth of the Gimogon River, to which point a launch drawing 6 feet can proceed, passing over the bar at the mouth of the river at high tide. This mill consists of one circular saw, with a top saw, one edger and a saw filing machine. The mill, I judge, is not a new one, and is lacking in a number of modern improvements, viz, a suitable "nigger" for handling logs on the carriage, a chain operating from overhead being used. The carriage is operated by a cable and not by the "shot-gun" feed in common use to-day in the United States. Rollers to carry lumber to the edger are not "live," but boards are run along dead rollers by native help and the edger used is of old pattern. Logs are brought into the mill by means of a cable on an inclined slide, and not by an endless chain as is customary.

Owing to the lack of timber the mill has not run to its capacity at any time, the daily cut being from 4,000 to 5,000 feet B. M. About January 1 a flood occurred, the river rose at least 15 feet, flooded the mill, and submerged most of the machines for a time, resulting in considerable damage to the belts, which since that time have caused much trouble by breakage. A portion of the river bank near the mill was washed out, necessitating the removal of the mill to some other spot. The mill force consists of 1 American sawyer, who knows but little regarding such work, 1 American foreman, and another American who acts as engineer, etc. Three Filipinos work on the carriage, 2 at the edger, 1 as fireman, and 3 or 4 as general hands. At the present time they have no one who thoroughly understands the running of a mill, and no one who can properly file saws and do general machine work, and hence the machines do not work smoothly.

The above conditions are largely due to disappointment in men brought from the United States, who have proved to be incapable and have been returned. I do not believe the mill can be run successfully until expert help is secured; men who thoroughly understand millwork and the repairing of machinery, and especially a saw filer who can keep the saws, a vital part in a mill, in good condition.



VIEW ALONG MAIN HAUL FROM NEAR ROLLWAY, SHOWING SKIDDING ENGINE NEAR EDGE OF FOREST. LOGGING PLANT OPERATED BY INSULAR COMPANY, GIMOGAN RIVER, NEGROS OCCIDENTAL.



VIEW OF SKIDDING ENGINE USED BY INSULAR COMPANY, GIMOGAN RIVER, NEGROS OCCIDENTAL.



LAUAN (ANISOPTERA THURIFERA BLUME) ON EXTREME LEFT. APITONG (DIPTEROCARPUS GRANDIFLORUS, BLUME) IN FOREGROUND.
GIMOGAN RIVER, NEGROS ORIENTAL.

Up to the present time between 60,000 and 70,000 feet B. M. has been sawed in this mill, the greater part being shipped to Iloilo, though some sawn timber has been used in the construction of three or four dwelling houses and a roof for the mill, and some was lost during the recent flood—being carried out to sea. Fifty or sixty logs were also lost in this manner and most of this will be a dead loss to the company, as a good part of the timber is scattered beyond recovery.

Timber can be cut, taken to the mill and sawed, at a cost, I am told, of one-half to three-fourths of a cent, gold, per foot B. M., and it is claimed with suitable skilled labor it can be done for less. Freight in lorchas to Iloilo varies from $5 to $6, gold, per 1,000 feet B. M. Government charge for stumpage averages less than $1.50, gold, per 1,000 feet B. M. This timber finds a fairly good sale at from $30 to $35, gold, per 1,000 in Iloilo, but at a somewhat lower price would sell more readily; the above price being about the same as similar classes of timber can be secured from other lumber merchant who use whip saws in sawing their lumber.

A more ready sale for timber could be found in material sawed to order, as many desire dimension stuff, planks, etc., which the company has not on hand in any quantity, since each individual desires different dimensions and classes. Sawing dimension stuff to order would be one advantage in having the mill at Iloilo; they could saw timber by contract with other parties. It is partly a question as to the cost of rafting logs to Iloilo, and the possible loss of rafts during bad weather prevailing at certain times of the year, as to whether the placing of the mill in Iloilo would be best. If logs were not rafted during the season when storms may occur a large number must be collected during the good season and operations suspended in the woods for several months during the year.

In sawing timber it has been found that logs up to 2½ feet are generally sound, but that logs over that size are frequently either partly rotten at the center or else as in Balacbakan (Red Lauan, so called) from 6 to 8 inches of the heart is very brittle and of no use except as fuel for the boilers, and 2 by 4 by 12 inches sawn from the center of one of these trees will frequently break from its own weight when supported only at the two ends.

LOGGING OPERATIONS.

The company started operations in the forest at a point about 8½ miles from the mouth and on the west bank of the Gimogon River. Here a rollway was made, the bank rising almost perpendicularly from the river to a height of 150 feet; much steeper than is desirable. In order also to have the logger available for skidding logs to the main haul, the "donkey" was placed near the edge of the timber, about 1,500 feet due west. This logger is of recent pattern, No. 641, and made by Washington Iron Works, of Seattle, Wash. The horse-power of the same was unknown by the parties at the mill. The main cable used for the donkey to the rollway is 1 inch, and the "haulback" cable three-fourths of an inch, the cable at the rollway passing through a simple block firmly fastened to a stump. Radiating from the donkey in several directions are logging trails where timber has been taken out for a few hundred feet back, the longest of there trails being about 1,200 feet, but trees only close to it have

been cut. A three-fourths inch cable is used to skid the timber down to the main cable.

A much more satisfactory arrangement would be a skidding engine, placed where the present donkey is, to be used in skidding the timber to the main haul, and the present donkey then being placed at the rollway, instead of in the forest as at present. As soon as possible this change will be made, but possibly financial difficulties will interfere for a time in securing the additional equipment.

The force in use at the logger when it was in operation consisted of 1 American engineer, 2 natives to cut firewood for the boiler, 3 native water carriers, who transported the water from a small stream about 1,500 or 2,000 feet distant, two cutting gangs of 2 men each, swampers, 8 men at the rollway who saw up long logs as they come from the forest and then roll them into the river, and a dozen or so general men (the number varying more or less), who dragged the skidding cable back into the forest from the donkey. This required from 12 to 15 men, according to the distance necessary to drag it. Three carabaos were tried for this work at first but were not able to haul the cable.

But little timber has been cut in the forest so far, as the donkey was placed in an old burn, where a good number of large trees stood and about all of these were cut. All the trees have been cut at the upper termination of the root swelling, which in cases left them pretty high, but I do not think it justice to the lumbermen in the islands that the bureau require them to cut through the larger buttresses in order to secure a lower stump. One evil present here is that a large number of poles are cut to build a scaffolding around each tree in order that the sawyers can work some feet above the ground. No attention is paid to the species cut, and where the larger trees stand fairly dense almost every pole is cut. This practice should be absolutely prohibited, except for woods of the fourth group, and a severe penalty imposed for the cutting of other woods. The merchantable timber in all trees felled has been utilized, but no use has been made of the larger branches. There appears to be a fairly good reproduction of most species where cutting has taken place in the forest, but the saplings and poles have been damaged to quite an extent by the large-limbed trees, when felled. It seems to me to be necessary that a minimum diameter limit of 18 inches be established and rigidly adhered to, and that the timber in the future be marked in order that there may be assured a sufficient number of seed trees per acre; this may not and probably will not occur if they are permitted to select the timber themselves.

In a more or less dense forest, such as found here, where all the mature timber is removed there remain but few trees, and many of these will be more or less maimed through the falling of the other trees, or else their growth will have been retarded by the large trees to such an extent that they will not be available for a few years as seed trees; hence, trees capable of producing seed at once and in abundance must be left in order that the blanks may be properly filled with seedlings before weeds and undesirable species have completely filled the space. These seed trees will also be available as shade for the younger growth present.

One man could mark in two weeks a sufficient amount of timber to run the company for at least six months, but I believe an inspection

should be made of the tract at least four times per year in order that suitable control may be maintained over the cutting operations.

By measuring the logs before the same leave the rollway the bureau insures itself against possible loss by floods carrying off timber before it is measured, as happened during December. From 10 to 20 per cent of each of the larger logs are found to be worthless for lumber, and as the bureau does not secure payment for this now, as payment is made on sawn timber, plus 15 per cent, I believe some scale just to both the interested parties and the bureau could be devised which would more nearly be adapted to the existing conditions.

In scaling the timber some arrangements should be made whereby allowance for defects in timber can be made, and all timber be measured in the log at the rollway before it is put into the river. By making allowance for defects the company can afford to take out more or less defective logs, which otherwise they would leave, and payment for forest charges on the full volume of timber would result in a hardship, due to the general defective character of the centers of large logs. The logger so far has taken out from 4,000 to 5,000 board feet per day, but with a competent man to handle the skidding engine a much larger amount of timber could be taken out. Two men can fell and saw an average of two trees 3 feet in diameter per day, the same being four or five log trees. These logs are frequently left in 24 to 36 foot lengths, sometimes longer, and skidded to the rollway, where they are then sawed into the proper lengths of 12, 14, or 16 feet.

The natives have been found to be very apt in learning the work, and received much praise from all Americans under whom they are working. Both Mr. Nichols and Mr. Kearney stated that for work in the woods they desired no better men. They have also picked up the mill work very readily and made good mill hands, but they have not a proper regard for the danger attending such work, and hence must be carefully watched in order that they will not be injured. Wages are paid to all workers at the rate of 65 cents local currency per day, without food.

A gratuitous license has been granted to the company for lumber to be used in the sawmill and buildings connected with it, as the mill and necessary buildings are a benefit to the community and can be considered in the light of general improvements.

An indispensable part of such a skidding and logging outfit is a machine shop where broken parts of machines can be repaired without a long trip to Iloilo, consuming several days and entailing a large expense. Frequently the parts can not be found in any shop in these islands and must be made, causing a further loss of time and additional expense. Such a delay has occurred with the machines at this point, and in the near future a machine shop will be added to the equipment.

Parties contemplating the installation of plants should be prepared to fully equip the same with duplicate parts and have a machinist capable of repairing any part of the machinery. It is very difficult and expensive to attempt to carry on the business in any other way in this country, where transportation is deficient, and failure will undoubtedly be the result unless the subject is investigated very thoroughly beforehand.

LICENSES.

The division of forest management has direct supervision over the granting of licenses and the logging operations of licensees, but before the issuance of licenses the same are submitted to the secretary of the interior for his approval.

During the past year licenses to cut, gather, or remove the following forest products from public lands were granted, viz: Timber, firewood, charcoal, tan bark, dye bark, dyewoods, gums, resins, vegetable oils, diliman, beeswax, honey, orchids, stakes for fish corrals, and wood for shoes. The new "forest act" provides that the last six products may now be gathered without license.

At the commencement of the fiscal year new forms of applications for licenses were forwarded to the forest stations and by them distributed to all applicants and to the municipalities.

All applications for licenses first pass through the hands of the local forest official, who places his recommendation upon the same and forwards them to the main office.

All applications made personally in the Manila office are forwarded to the local station for the recommendations of the forest official of the province where the applicant desires to cut.

The same policy as adopted in former years regarding preference in granting licenses was followed out during this year, viz: Old licensees who are residents of the town in which they desire to cut are given first consideration; new applicants living in the town in which they desire to cut are given second consideration; old licensees who are residents of the province, but not of the town in which they desire to cut, are given third consideration; and nonresidents fourth consideration.

In this way an attempt is made to favor actual residents as far as possible, and parties who can personally superintend operations in the forest.

A system of regular examination by forest officials of the cutting area of each licensee was inaugurated and full reports, on forms provided for that purpose, were submitted, stating the method of logging, whether any new and modern appliances were being used, general condition of the forest, business standing of the licensee, and the places where timber is marked, etc. A careful record of all infractions of each licensee was kept in this office and the same filed with the above report, so that at any time a complete history of any one licensee can be obtained, and the above reports are carefully examined before a new license is issued to any party. Foresters, inspectors, and assistant inspectors have instructions to take a native ranger with them when making these examinations, in order that the rangers may become familiar with this class of work.

The forest officers in charge of 12 forest districts, covering 35 of the 40 provinces, continued to grant ordinary timber licenses not to exceed 13 cubic meters to each person. They were also authorized to grant firewood and gratuitous licenses not to exceed the above amount.

In the 5 forest districts, viz, Bataan, Zambales, Ambos Camarines, North Tayabas, South Tayabas, and Masbate, where the lumbering is greatest, all applications were forwarded through the forester in charge, who inspected the locality where the applicant

desired to operate, and then reported to this office upon the territory desired by the licensee, stating the approximate area which should be granted him, describing the forestal and topographical conditions of the same, and locating the boundaries of the tract as nearly as possible by natural boundaries. The species and amounts of timber which should be cut annually in this tract, and the minimum diameter of all trees to be felled, is stated. Each applicant was granted but one tract in which to cut, so that the responsibility for any damage to the forest could be readily placed, but in consideration of the special rules applied to such tracts, every effort is made to protect the licensee in the area allotted to him, in order that he may enjoy the full benefits to be derived from any improvements, such as roads, trails, etc., made by him.

In the above forest district several of the larger operators, who closely followed the rules laid down by the forester in charge, were permitted to remove, under license, an amount of timber in excess of the amount granted by the original license.

The number of applications for licenses received and granted during the present fiscal year greatly exceeded those of the past year. Many applications for the renewal of former licenses were disapproved for violations of the "forest regulations" during the past year. All timber licensees were allowed four months from the date of the license in which to commence operations, and a number of licenses were canceled for failure to comply with this provision.

Due to the partial or total destruction by wind and fire of various towns throughout the islands, there was a notable increase in the number of gratuitous licenses granted to needy residents, the demands of the afflicted residents for timber to reconstruct their homes being granted as promptly as conditions permitted.

In several of the provinces where the greatest damage was caused, the forest officers in charge of districts traveled over the entire province and granted gratuitous licenses to several hundred needy residents in each town.

A statement of all licenses granted during the fiscal year ending June 30, 1904, is attached hereto; also a list of company licenses granted, showing the amount of timber granted each company, and the amount cut.

List of licenses granted during the fiscal year 1903–4.

Province.	Timber.		Gratuitous.		Firewood.		By-products.	Total.
	By bureau.	By subordinates.	By bureau.	By subordinates.	By bureau.	By subordinates.		
Albay	21		2		9		2	34
Abra	34	7	7	34		15	3	100
Antique	4		1			3		8
Bataan	37		3	25	2	18	2	87
Batangas	16		2		17		1	36
Bulacan	19		1		8		20	48
Benguet	9		7		1		2	19
Bohol	4		2	11		2		19
Cavite	5		1		15			21
Cebu	12		1			10		23
Capiz	20	4	11	1		12	5	53
Cagayan	30	18	4	24		3	2	81
Camarines	22	25	7	27		41	12	134
Cottabato	4				3	1	13	21
Davao	11		1	3			33	48
Ilicos Norte	27	20	9	88		8		152

List of licenses granted during the fiscal year 1903–4—Continued.

Province.	Timber.		Gratuitous.		Firewood.		By-products.	Total.
	By bureau.	By subordinates.	By bureau.	By subordinates.	By bureau.	By subordinates.		
Ilocos Sur	10	51	5	5		17	1	89
Iloilo	33	5	6	83		61	36	224
Isabela	16		2					18
Jolo							1	1
Laguna	27		35		14		1	77
Leyte	30	17	3	31		22	3	106
Lepanto-Bontoc	4		4					8
Mindoro	37		6		32		39	114
Masbate	38	10	4	30		23	15	120
Misamis	21		1				1	23
Nueva Ecija	26		6		7		2	41
Negros Occidental	71	38	12	22		63	25	231
Negros, Oriental	34	11	3	6		17	3	74
Neuva Viscaya			1					1
Pampanga	29		3	2	18	14	1	67
Pangasinan	29		7	2	37	2	7	84
Paragua	26	18	4	28		15	22	113
Rizal	27		55		21			103
Romblon	21		2		6		5	34
Sorsogon	22		3		21			46
Samar	41	20	4	62		18	2	147
Surigao	19	7	3	10		4	3	46
Tarlac	31		11	10	41		4	97
Tayabas	55	32	21	45		44	32	229
Union	27		4		2			33
Zamboanga	28	18	3	16	1	18	17	101
Zambales	50	3	15	58		37	40	203
Total	1,027	304	282	623	255	468	355	3,314

Company licenses, 1903–4, and amount of timber cut.

Company.	Location granted.	Amount granted.	Amount cut.
		Cubic ft.	*Cubic ft.*
Benguet Commercial Company	Baguio, Benguet	50,000	39,173
Philippine Lumber and Development Co.	Dalupaon, Ambos Camarines	100,000	95,016
Calvo y Compañía	Ragay, Ambos Camarines	60,000	46,406
Inchausti & Co	Ajuy, Iloilo	50,000	4,105
Divilican Lumber and Development Co.	Divilican Bay, Isabela	100,000	3,990
Diamond Lumber and Development Co.	Puerto Galera, Mindoro	100,000	17,957
Mindoro Commercial Co	Bongabong, Mindoro	100,000	31,198
Alvisse Lumber and Development Co	do	100,000	2,453
Insular Trading Co	Abra de Ilog, Mindoro	50,000	
Visayan Commercial and Development Co.	Cadiz Nuevo, Negros Occidental	60,000	
Iloilo Electric Company	Sagay, Negros Occidental	100,000	27,894
Weinmann, Alejandrino & Co	Arayat, Pampanga	100,000	10,074
Bertran de Lis & Murga	Babuyan and Tinitian, Paragua	100,000	34,087
Mindoro Lumber Co	Baler, Tayabas	100,000	13,773
Gerena & Co	Calauag, Tayabas	100,000	25,710
Compañía Maderera de Luzon	Guinayangan, Tayabas	75,000	61,599
Basilan Lumber Co	Isabela, Moro	100,000	36,900
Masinloc Improvement and Development Co.	Bungaan, Zamboanga	100,000	473
Philippine Lumber and Commercial Co.	Santa Maria, Zamboanga	100,000	7,519

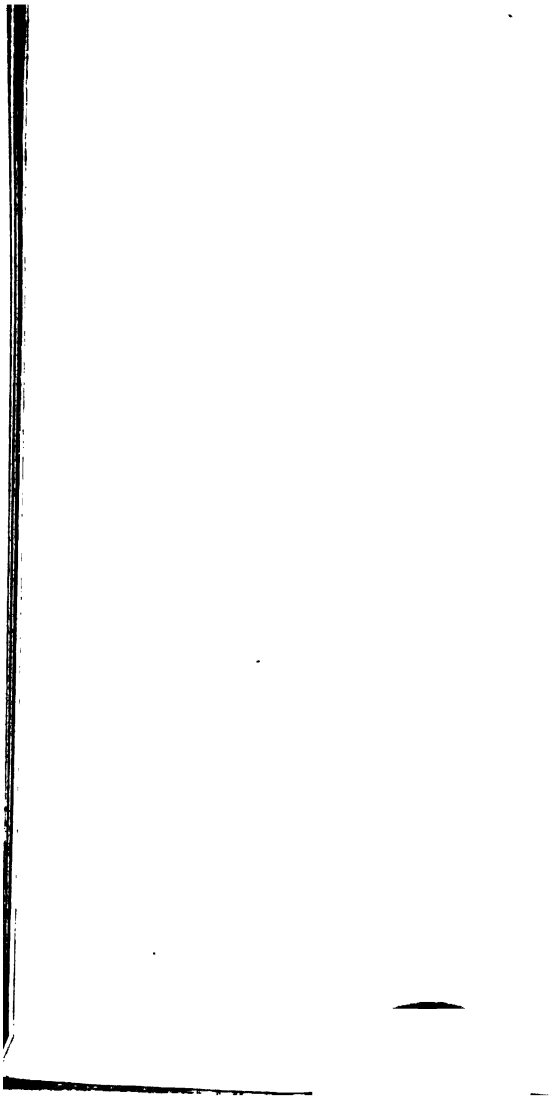
General reports containing information regarding the character of the districts, short descriptions of the forest areas, various silvicultural notes and recommendations for the following year were submitted by each forester on December 31, 1903. Two of these reports are here given, in order that a general idea may be obtained of the work being carried on in the various forest districts. They are of especial interest in that the work being done marks the beginning of the first attempt ever made to carry out a policy of rational forest management in the Philippine Islands.



PINE (PINUS MERKUSII), OPEN STAND NEAR SANTA CRUZ, ZAMBALES.



PINE (PINUS MERKUSII, J. AND DE V.), SHOWING CHARACTER OF TRUNK AND BARK, ZAMBALES PROVINCE.



FOREST DISTRICT OF BATAAN AND ZAMBALES.

[Report submitted December 31, 1903.]

I.—GENERAL DESCRIPTION OF DISTRICT.

The forest district of Bataan and Zambales, comprising an area of 1,068,200 acres, can best be described under two separate areas, comprising distinct physiographical conditions:

The district of Zambales occupies a long, rather narrow strip along the western coast, having a general northern and southern trend 110 miles in extent, and an average width of 20 miles. A long, nearly continuous mountain chain forms its eastern boundary, from which radiate, in a general westerly direction, numerous valleys with small rivers. The altitude of the main range varies from sea level to about 4,000 feet.

Soil.—The soil of this region may be described under double caption: (1) That of the high slopes and ridges; (2) alluvial soils of the plains and valleys.

The former is a loose, sandy, porous soil, easily washed, leaving numerous rocks on the surface. Traces of copper are generally found, which give it a dark brown color.

The soil of the lowlands and valleys is a loose, coarse sand, quite porous, containing but little humus even in the dense forests, and practically free from rocks.

Rocks.—The character of the rock is similar, being a relatively hard sandstone, cropping out here and there in the ravines and river beds. Limestone deposits, bearing traces of coral, are found near Masinloc, showing that the sea formerly extended further inland. Rocks of large size are uncommon, but small surface rocks are plentiful.

The long coastal plain between the base of the mountains and the sea is practically devoid of forest growth, or when such growth occurs, it is always semiopen and of poor quality. This area is generally well adapted to agriculture and for grazing purposes, while the immediate shore line is devoted, in many places to the growing of cocoanuts.

In the region of Masinloc and Iba sugar cane grows well, while farther south, on the low plains near San Narciso and San Marcelino, the culture of rice is carried on extensively.

Social.—Zambales is peopled by an extremely cosmopolitan population, the general location of the various tribes being as follows: Zambal, at Santa Cruz, Iba, and Botolan; Pangasinan, at Dasol; Ilocano, at San Antonio, San Marcelino, and San Narciso; Tagalog, at Iba and Subig.

The Zambalese dialect, which is in general use, differs but little from the dialect of the Negritos, who inhabit the forests of the southern part of the province. Speaking generally, the people are extremely poor, and the Zambalese (Zambal) are indolent and worthless laborers, an entire family living crowded together in a small nipa house.

II.—FOREST AREA.

The forest areas in different parts of Zambales differ greatly in quality and density. Large prairies, covered with tall cogon grass, and without a single tree, occur in places on the mountain sides and on the lowlands, and these are frequently burned over to improve the pasturage.

The absence of any forest growth on such prairies may be due to the presence of large quantities of copper in the soil and rock, as the soil is frequently deep and moist, and otherwise favorable to tree growth.

The mountains and slopes east of Santa Cruz, extending south almost to Iba, are densely forested. After a short, broken interval, the forest begins again near Botolan, and, with few exceptions, covers the mountains of eastern Zambales to the southern limit. The leading species in order of abundance are as follows: Apitong (*Dipterocarpus grandiflorus*, Blanco), Tanguile (*Shorea talura*, Roxb.), Guijo (*Anisoptera guiso*, A. D. C.), Lauan (*Anisoptera thurifera*, Blume), Banaba (*Lagerstroemia flos-reginæ*, Retz.), Acle (*Pithecolobium acle*, Vidal), Yacal (*Hopea plagata*, Vidal).

Stand.—The stand of timber is generally dense, many species growing in common and utilizing all the area. The trees, especially the family *Dipterocarpaceæ*, of which the forest is mainly composed, form tall, straight, clear stems, with heavy, short crowns. With the exception of yacal, naturally more or less knotty, the forest trees are free from defects, such as heart rot, and when cut but little waste results from such cause. Pure stands of any considerable extent are not found, although some species tend to form groups.

Altitude, which is an important factor in forming zones or types, does not have as decided an effect in the Tropics as in colder climes. However, we see instances where it is effective, such as in the pineries on the high mountain slopes of Zambales, at and above an elevation of 1,600 feet. In such places these species tends to form pure stands, open in character, with scarcely any associated species. This appears to be a matter of soil influence, as one sees in the same region areas practically devoid of any tree growth except pine.

Apitong is found under various conditions, and seems to be effected but little by the influences of altitude, slope or density, always having the characteristic long, straight, clear bole peculiar to the species. It forms the greater part of the stand, occurring either individually or in small groups. Apitong ranges in height from 150 to 280 feet, with clear lengths of more than 100 feet, and maximum diameter of 60 inches, breast high. Unless found in very dense stands, this species suffers but little from shade; on the other hand it thrives fairly well in the semiopen when soil conditions are favorable.

Apitong is an abundant seeder, with a high germination per cent. For its best development it prefers a low, moist location, with deep, loose soil, but reliable natives have informed me that the timber is more durable when taken from high, rocky slopes. This seems to apply equally well to other species.

Tanguile is found on the higher slopes, growing in deep, rich, moist soil, and attains a height of 180 feet, with clear lengths of from 80 to 90 feet. This tree, where conditions are favorable, is found growing in association with other species. For its best development it requires a rather dense stand, where the soil is not exposed to drought. The crown is rather short, heavy limbed, and with panao and apitong forms an upper story in the forest. It flowers during March or April, the fruit ripening in August.

Tanguile does not reproduce abundantly under normal conditions. Seedlings and succeeding stages grow more abundantly when not exposed directly to the sun, but they must have a moderately open condition for best development.

Guijo has a wide distribution, growing independently and occasionally forming small groups. In appearance it resembles palosapis (*Shorea* sp.), but attains a larger size, having clear lengths ranging from 60 to 90 feet. The trunk is ordinarily straight, cylindrical, and free from defects. The crown is moderately long and spreading when not growing in dense stands. Reproduction is abundant in seedling stage. This species is moderately light-demanding, but in the open it develops a poor form. I have found seeds falling in February from trees abundantly stocked, but the time of seeding seems to be quite variable.

Lauan is probably the most widely distributed species of commercial importance in this region, due to its ability to grow under varying conditions of light and soil. It is found growing singly on the high slopes as well as on the low flats, occasionally occurring in groups of limited extent. The bole is long, clear, and generally straight, tending to form large root buttresses in exposed situations or where the soil is not sufficiently deep to allow the tap root to develop. This root-swelling does not extend for more than 8 feet above the ground, the remainder of the bole being cylindrical. The average clear length of mature trees of this species is about 65 feet. The crown is long and tends to spread when space permits. Observations have shown this tree to be a rather poor seeder, but seeds which mature have a high germination per cent. Lauan reproduces well and trees of all ages are found in good condition where proper seed trees abound. Large over mature trees of this species are commonly infested with certain destructive fungi, which, entering at broken branches and places where the bark has been removed through injury, gradually causes the decay of the center of the tree.

Acle forms an important forest tree in northern Zambales, but is only used for local consumption. It prefers a moderately dense forest on the lowlands, occasionally being found on the higher slopes, and tends to form small groups irregularly distributed through the forest. The bole is short, averaging in clear length 30 to 35 feet, while specimens with a diameter of 50 inches are occasionally found. The trunk is rough and frequently covered with large burls, which, however, do not necessarily injure the quality of the timber. The crown is long, with slender, spreading branches, and in general appearance this species resembles the common wild cherry (*prunus serotina*) of America.

Acle is a fairly abundant seeder, the fruit being borne in large pods, which fall in September, but owing to their heavy character they are not adapted to distribution through natural means, and, therefore, do not reproduce abundantly, probably due to the fact that some of the large seeds are consumed by birds and others, falling in damp places, the characteristic location of the trees of this species, soon become sterile.

Yacal occurs on the steep, rocky slopes and ridges where there is sufficient moisture and shade to prevent the soil from becoming too dry. It is a tree of the high slopes and I have never found it growing on flats or near the seacoast. Pure stands of great extent do not exist, but in certain localities offering favorable conditions for its development and growth it is found in abundance, with such associates as tanguile, apitong, and lauan.

The quality of yacal in northern Zambales is superior to that of the southern part, generally being less defective. Clear lengths of from 50 to 70 feet are common. Owing to the thin soil in which it grows yacal forms large root buttresses, which necessitates the leaving of high stumps when the trees are cut. The crown is moderately long and rather dense. Reproduction is abundant in moderately shady places possessing a moist, sandy loam soil. I have not observed this species in fruit, but judging from the amount of young growth it must seed rather abundantly.

III.—LUMBERING.

In Zambales lumbering for the general market is confined largely to that portion of the province south of Iba, the majority of the licensees being located in the Subig Bay district.

The lumbering conditions in Bataan Province are very similar to those in Zambales.

No modern lumbering methods have been introduced in this region, and all trees, with few exceptions, are felled and hewn with the native ax. The style of ax employed is a clumsy affair with a narrow bit, which, however, is quite effective in the hands of a good native axman. The hard character of the wood does not permit the use of the broad-bitted American ax in felling. In a few instances, where valuable timbers are secured and where labor is scarce, a few of the more intelligent licensees have successfully used saws for felling trees and sawing out timbers.

After felling and squaring the tree to the largest size possible, the stick is hauled, generally by carabaos, to the nearest river and floated to a common rafting place on the coast. Short, round rollers, cut from small trees growing near the trail, are used in transporting the timbers from the forest, and as no care is exercised in selecting them many good species are so used.

Small holes are cut in the front end of the logs for the purpose of attaching ropes, and the under surface is "sniped," in order that the log may easily pass over obstructions in the trail. In rocky places, where carabaos are unable to work, large logs are frequently taken out by men, aided by rollers and block and tackle. In such cases trees near the water, where the slope is steep, are usually selected for felling.

In regions, as at Subig, where there is scarcely any business other than the cutting of timber, it is comparatively easy to secure laborers at from 50 to 60 cents Mexican per diem, but naturally in places remote from commerce labor is more scarce and demands higher remuneration, even though it be unskilled. A number of licensees have expressed a desire to cut in places where timber could be readily secured, but have been handicapped by these conditions.

A large part of the timber cut in this district is of the third group, and owing to the proximity of this district to the Manila market and the transportation facilities available, good profits are realized. The average price paid per cubic foot for timber delivered on the beach is, for second-group woods, such as guijo, from 12 to 14 cents local currency, and for third-group timbers, 10 cents. There is some variation in price according to the size of the log, larger pieces bringing slightly more per cubic foot than the smaller ones.

In certain localities in Bataan, especially at Bagac, lumbering is confined almost entirely to cutting timber for bancas or for local house construction. Many bancas are required at this place for local use, but some are also constructed for the market. The following species are those generally preferred for banca construction: Lauan, tanguile, calantas, and palosapis.

Season of cutting.—The season of timber cutting is practically dependent on the rice crop, and in regions where rice is grown extensively timber cutting is secondary, not only because labor at harvest time is not available, but also from the fact that during planting dams are constructed here and there for irrigation purposes which retard the transportation of timber by water. The above conditions prevail largely in eastern Bataan and to a certain extent on the western coast. At Subig, where but little rice is grown, the cutting and hauling of timber is carried on throughout the year.

IV.—LICENSES.

In Bataan Province 36 licenses have been granted, with a combined volume of 351,000 cubic feet.

Two hundred and forty thousand seven hundred and sixty-seven cubic feet of timber have been marked for 23 licensees in Bataan, of which amount 35,125 feet had been cut by the above licensees up to December 1, 1903.

In Zambales Province there are 51 timber concessioners who were granted a total volume of 469,000 cubic feet of timber. Two hundred and sixty-five thousand and thirty-five cubic feet was marked for 30 concessioners, of which amount 164,035 cubic feet was cut up to December 1, 1903.

V.—WORK MAPPED OUT FOR NEXT SIX MONTHS.

During the next six months a general inspection of the district is contemplated, the main object being to review the work done by licensees during this present season. The results obtained by the apportionment of forest tracts to licensees will be investigated and future plans will depend largely upon the conditions found at the time of inspection. Licensees who have not exerciesd proper care in carrying out their contract will be recommended for suspension, and such areas as show a too severe selection will be recommended for reserve.

On trips such as this work will require, notes will be made on the outline and topography of forest areas, with a view to perfecting the forest map of this district. As time permits studies will be made of the more important forest trees, especially of the family *Dipterocarpaceæ* and others of commercial importance.

In the past the forest regulations have been practically ignored, especially those intended to improve forest conditions, and in the future considerable attention will be devoted to spreading a knowledge of the regulations among the lumbermen in order that at least the rudiments of the same may become generally known.

VI.—FOREST STATIONS IN DISTRICT AND ADMINISTRATION OF SAME.

The following is a list of forest stations situated in the district of Bataan and Zambales:

The station located at Masinloc, near the northern end of Zambales, has jurisdiction over all towns as far south as Iba. This section is characterized by valuable forests, but as yet only minor forest products, such as charcoal, firewood, and small quantities of resins are taken from the public forests for market purposes. Concessioners holding ordinary timber licenses in this section cut timber largely for local consumption.

Subig forest station, at Subig, near the southern extremity of Zambales, has its northern section limit at Botolan, Zambales, and includes all towns as far south as Moron, Bataan.

District headquarters are also located here, as this town is the most central location in the district.

The section yields the greater part of timber shipped from the district, only small quantities of minor forest products being gathered. Two rangers are assigned to this section.

The forest station at Hermosa, near the eastern coast of Bataan, includes the towns from Dinalupijan and as far south as Samal. It is in charge of one ranger.

The southern forest station of eastern Bataan is located at Balanga, in charge of one ranger, and includes those towns south of Samal, on the east coast, and Bagac, on the southwest coast of Bataan.

Where forest stations support two rangers, the senior ranger is in direct charge, while the districts are under the care of the forester. The foresters working under the direction of the bureau of forestry have charge of the administration of the forests and supervision over the forest products of their districts. Rangers are required to visit various towns and forests of their section as frequently as time will permit, such results as are obtained being given on the monthly report of each ranger. Stations supporting two rangers permit one to be absent from the station on inspection trips.

VII.—CLEARINGS, FIRE WARDENS, ETC.

The problem of regulating the making of "caiñgins" in the public forests is one difficult to solve in a satisfactory manner, and owing to various conditions of locality as affecting their value, and the conditions of natives making them, it seems that one general law, with the idea of solving the question, would be too sweeping to be effective.

In quite a number of cases the clearing of an area of forest is of extreme importance from many standpoints, and stringent means should be adopted to prevent it. Take, for example, the immediate region of Subig. In the past, clearings of considerable extent have been made adjacent to the coast, while within a profitable lumbering distance practically virgin stands are still found. In such cases the forest area has been so denuded by lumbering that but little expense and labor is required to complete the devastation and prepare the land for agricultural purposes. Such tracts, in the course of a few years, are deserted and grow up in a dense, worthless tangle, generally with species poor in form and quality.

On the other hand, one sees clearings of considerable extent farther inland, where the greater part of the stand is not better than third group, and, according to present methods can not be removed profitably.

During the year some 80 persons have been apprehended in this district for making clearings on public lands, and while much dissatisfaction was apparent on the part of the trespassers, yet a noticeable decrease has taken place in transgressions.

During the past year many fires have occurred in the forests, especially during the dry season, where large areas had not previously been cut. These fires were generally small, consuming only the dry tops and refuse left after felling, and in no case did fire spread into the virgin forest.

It seems that fire wardens (especially in certain districts), where much cutting is done would be of great value. Such men could serve also the purpose of scouts and report any illegal use of timber. These wardens could be subordinated to the rangers of the section and a careful record kept of all operations, such as places visited, extent of damage caused by fire, and name of guilty party.



PREPARING TO REMOVE A BANCA FROM THE FOREST. BATAÁN PROVINCE.



"CAINGIN," OR CLEARING IN FORESTS MADE BY BURNING. COCOANUT PALMS IN BACKGROUND DAMAGED BY FIRE.



ROOT SYSTEM OF MATURE AGOHO (CASUARINA EQUISETIFOLIA, FORST).

The roots have been uncovered by the action of the sea, and although exposed for several years the trees are thrifty and bearing fruit.



VIII.—RECOMMENDATIONS.

From the experience gained during the short term in which marking has been in vogue, it is obvious that at least certain sections of forest area should be marked, in order to show approximate sustained yield. Owing to indiscriminate cutting by concessioners and others in the past, even reduction of number of concessioners in any one section would not alone suffice.

There are a number of licensees who are considerably isolated; and where there is a large scope of practically virgin forest from which to select the necessity of marking timber for felling is not apparent. In such cases, the forester who is thoroughly acquainted with his district should be able to decide. This is especially applicable where the forest is composed of trees below the first group, or would hold true when trees of better groups were largely in evidence. Such a plan, having been tried and found unsatisfactory, one could impose a higher diameter limit in order to suit the locality. In many cases ordinary timber licenses are solicited which call for greater amounts than can at present be granted by a forester, and I believe that the forester should be allowed to grant ordinary timber licenses not to exceed 1,000 cubic feet.

Owing to the large amount of timber shipped from this district, I recommend that at least one assistant inspector be provided.

WM. M. MAULE, *Forester.*

THE FOREST DISTRICT OF SOUTH TAYABAS.

[Report submitted December 31, 1903.]

I.—GENERAL DESCRIPTION OF THE DISTRICT.

The forest district of South Tayabas extends from the south boundary of the province of Batangas to the southern end of the Tayabas Peninsula, with a total coast line of about 90 miles and an average width of 7 miles.

In the north end of the district, Mount Banahao, an extinct volcano, rises to a height of about 5,000 feet, and from it extends a central ridge running through the whole province, with an average height of about 500 feet. Beginning at Laguimanoc the ridge extends farther back into the interior, and a row of low hills runs along the coast. Many rivers, some of them of considerable size, come down from the central sierra and break through the low hills along the coast. In some of the rivers the tide water runs back a distance of 8 miles, such rivers being available for floating timber to the coast. Beginning at Catanauan grass lands extend between the mountains and the coast.

All the rivers have more or less a swamp forest on the lower part of their course; back of these are clearings and cocoanut plantations, and finally the forest, which to a large extent is already deprived of its valuable species.

Nowhere in this district is lumbering being done on a large scale, 30,000 cubic feet being the greatest amount of timber cut by anyone licensee during the previous year. In Unisan, Pitogo, and Laguimanoc there are shipyards where sailboats and small steamers are being built. Five licensees are engaged in this business, each one finishing about one boat in two years.

There is a small sawmill, with one circular saw, in Lucena, but it does little business. The owners buy the greater part of the timber and only run the mill when they have orders for a certain amount of sawn material, all of which is used locally.

Considerable firewood and some resin are gathered in this district and shipped to Manila.

The most important industry in this part of the province of Tayabas is the trade of copra, and many thousand acres are planted with cocoanut palms, about one-half of which are bearing fruit at the present time.

II.—FOREST AREA.

DESCRIPTION OF STAND, SILVICULTURAL FEATURES, REPRODUCTION, ETC.

The total forest area comprises about 300 square miles, one-half of which, due mainly to the great distance from the shore of some of the timber, and also the lack of suitable transportation, is virgin forest.

In that part of the forest where lumbering is carried on at present, and which has been lumbered for almost one hundred years, very few of the valuable species are left, and those remaining are mostly rotten or of such large size that they can not be taken out.

The greater number of trees in the stand belong to the second and third groups. The family *Dipterocarpaceæ* is largely represented by the following species: Yacal, apitong, lauan, and hagachac. The most important of the other species found are narra, dungon

supa, banaba, guijo, and macaasin. The reproduction in general is fair and that of the family *Dipterocarpaceæ* good.

The underbrush, with few exceptions, is very dense, consisting mostly of bejuco (at least three different kinds), palma brava, timac, and saplings.

In most instances the underlying rock is limestone, sometimes soft, sometimes very hard tufa. Sandstone and quartzites are also found in a few places. The soil varies from an almost pure sand to heavy clay loam. The latter becomes very soft during the rainy season and cracks when exposed to the sun.

During the first part of the year studies were made on the reproduction and the silvicultural conditions of the more important timber trees, principally in the vicinity of Laguimanoc, where extensive cutting has taken place for almost one hundred years. Half-acre areas were measured, and every tree down to a diameter of 3 inches calipered. Several of these areas were selected for each species, giving different conditions of altitude, slope, exposure, and soil. In these areas there were subdivided two small squares, each containing one one-hundred and twenty-eighth of an acre, and every seedling counted. These squares were selected so that one was in the lightest and the other in the shadiest spot on the half acre. The following silvicultural notes have been taken from the original report submitted on the studies made:

Molave (Vitex altissima).—Generally found on slopes with different exposures, in shallow, loamy sand with underlying limestone, at altitudes from sea level to 900 feet. Reproduction is fair in places where much light can reach the soil. In old clearings and along trails a sufficient number of saplings can be found to insure a good aftergrowth. The largest tree found had a diameter of 50 inches, the maximum height was 85 feet, and the greatest clear length 25 feet, but as this wood is very valuable the large and crooked branches find a ready market.

Narra (Pterocarpus vidalianus, Rolfe).—Found on all kinds of exposures, slopes, and altitudes up to 1,500 feet. It grows best in deep sandy loam overlying limestone and sandstone. Reproduction is very good in open places, more than 200 saplings having been found around one tree in an opening. The largest saplings need a little shade for their best development. Narra reproduction is also found in abundance in old clearings, but here it is generally shaded too much by other quick-growing species, and a thinning out of the latter would be of great advantage. The maximum diameter of all trees measured was 60 inches, with a maximum height of 90 feet and a clear length of 40 feet.

Banaba (Lagerstroemia speciosa, Pers.).—Generally found on level or gentle slopes somewhat protected from strong winds. It grows in a deep sandy loam, overlying limestone, at altitudes from 50 to 600 feet. It is never found in wet places. Reproduction from seed is good in open places where young growth of all sizes can be found. It reproduces also by sprouts. It is sometimes found in almost pure stands. Maximum diameter, 25 inches; maximum height, 80 feet; maximum clear length, 35 feet.

Supa (Sindora wallichi, Benth.).—Found on moderate and steep slopes, but only near the sea; in few cases along flats near the shore, but never higher than 300 feet. It thrives equally well on all exposures on a shallow, sandy loam overlying limestone tufa. The reproduction is good, but best under a medium shade. Seeds are numerous, but the germination per cent is small, seeds rotting quickly when exposed to much rain. The greater part of the seedlings reach the pole-wood stage, at which time they should be thinned. Maximum diameter, 45 inches; maximum height, 95 feet; maximum clear length, 42 feet.

Yacal (Hopea plagata, Vidal).—Generally found on steep and rocky slopes on all exposures, at elevations from 50 to 600 feet. It grows best in a deep, dry, loamy sand overlying limestone and in a few places sandstone or tufa. Reproduction is good under medium dense shade, the seeds germinating equally well in light and shaded places, but the seedlings die after one or two years if light conditions are unfavorable. Maximum diameter, 40 inches; maximum height, 110 feet; maximum clear length, 60 feet.

Malabayabas.—Generally found on ridges at altitudes from 500 to 1,000 feet, on a deep, heavy, loamy soil with underlying limestone. Malabayabas is one of the few trees which occasionally occur in pure stands. In one instance more than 300 trees of a diameter of 3 inches and over were found on one acre. Reproduction is fair under average conditions, but best under a medium shade. The seeds, most of which live, germinate without any cover. The stand can be dense, as the foliage of Malabayabas is very open and does not give much shade. Maximum diameter, 41 inches; maximum height, 90 feet; maximum clear length, 30 feet.

Dungon (Heritiera littoralis, Dry).—Found on moderate to very steep slopes, on all exposures, at altitudes varying from 50 to 1,000 feet. It grows best in a rich, loamy sand, mixed with rocks of all sizes. The soil does not need to be deep and must not be too wet. Reproduction is good for all age classes. Young trees can stand a large amount of shade, but strong sunlight will kill them, while polewood and larger trees need a great amount of light. Maximum diameter, 35 inches; maximum height, 120 feet; maximum clear length, 50 feet.



TRANSPORTING LOGS IN THE PAGSOBANGAN RIVER, TAYABAS, BY MEANS OF CARABAO.



RED MALABAYABAS, GARDENA SP., PAGBILAO, TAYABAS. ALMOST PURE STAND OF RED MALABAYABAS AND MACAASIN.





SKIDDING LOGS ON SLED WITH CARABAOS YOKED AMERICAN FASHION, MINDORO.

Macaasin (Eugenia sp.).—This most numerous of all important trees is found everywhere, under all sorts of conditions, up to an elevation of 1,000 feet. Exposure, slope, and soil do not seem to affect its best development. The tree is only absent in the flats near the seacoast. It produces freely under medium shade, but can stand heavy shade better than too much sun. The seeds need a little cover of leaves or soil to germinate. Maximum diameter, 45 inches; maximum height, 105 feet; maximum clear length, 60 feet.

Guijo (Shorea guiso, Blume).—Found on gentle and moderate slopes at altitudes ranging from 50 to 500 feet. The best soil is a compact, sandy loam, with a subsoil of limestone. Reproduction is good and seedlings are numerous. Saplings and polewood are present in abundance. Seedlings can endure a dense shade, while saplings need considerable light. Maximum diameter, 40 inches; maximum height, 120 feet; maximum clear length, 85 feet.

III.—LUMBERING IN THE DISTRICT.

Lumbering in this district is conducted only on a small scale, the largest amount taken out by any one concessioner during any previous year being about 30,000 cubic feet. The majority of the licensees kept within the limit of the license granted them (10,000 cubic feet). The usual method of lumbering followed here is the same as in other parts of the islands. The licensees tell the woodsmen what kind of timber they desire, and the laborers go out and select trees of a moderate size that can be easily hauled out. The majority of the logs are squared in the woods and only a small amount of round logs are hauled to the beach. Timber is seldom cut farther than 3 miles from the water. Only in one case did I find trees cut as far as 6 miles from the nearest river.

The logs are skidded by carabaos to the nearest river and from there brought down to the sea either with the aid of bancas or bamboo floats. A part of the timber is used in the small towns along the coast for house and ship building. The other part, especially the more valuable species, is sent by sailboats to the Manila market.

The average price of timber delivered on the beach is 15 centavos per Spanish cubic foot, and to this must be added 30 to 35 centavos per cubic foot for transportation to Manila. From this, it follows that only such timber as will bring in that market more than 40 centavos per cubic foot can be shipped.

The sawing of timber into boards is done by hand, laborers being paid from 6 to 10 centavos per square foot, the price varying with the hardness of the wood. At this price two men can earn from 2½ to 3 pesos per day of twelve hours.

The money paid for the logs is usually equally divided between the cutters and the owners of the carabaos.

IV.—LICENSES.

From April to June, after the reproduction studies were finished, an inspection trip was made through the whole district and all licensees visited. Reconnaissance trips were made from each town into the adjacent forests, in order to be able to decide how much timber could be cut in each section and what licensees were deserving of new licenses. Later, when the applications for new licenses came in, the province was divided into subdistricts, rivers in the most cases forming the boundaries.

There are 22 timber licenses granted in this district. The areas assigned to each licensee vary with the density of the forest and the facilities of the licensee for lumbering. At present all ordinary timber licenses are limited to 10,000 cubic feet, but some of the licensees will receive permission to cut more as soon as the new forest law becomes effective. The smallest area contains about 10 square miles and the largest about 40, the latter consisting of about 75 per cent of grass land, while the former is densely timbered.

Marking began July 20 and was entirely finished November 18. In all cases as much of the timber was marked as the concessioner will be allowed to cut in case the new forest law is passed, the largest amount being 25,000 cubic feet and the smallest 10,000. A total of 2,276 trees were marked, which will furnish approximately 200,000 cubic feet of timber. These marked trees are distributed among the different groups as follows: Superior group, 6.44 per cent; first group, 0.76 per cent; second group, 50.40 per cent; third group, 33.88 per cent; fourth group, 8.52 per cent, and so far 30,000 cubic feet of the above marked timber has been cut and brought to market.

In marking the timber in this district I was not able to mark all trees which should have been removed from a silvicultural point of view. The idea I always kept in view was to leave enough seed trees of the important species, but many of the inferior species which should have been removed could not be marked, as the concessioner was unable to take them cut without great financial loss. The trees which could be marked to good advantage were scattered over so large an area that I was not able to mark more than 40 on an average in a day of ten hours. The majority of the trees selected for cutting had a diameter of from 20 to 30 inches, none had less than 15 inches, and only a few more than 40.

V.—WORK MAPPED OUT FOR THE NEXT SIX MONTHS.

The work mapped out for the next six months is, first, reconnaissance trip to that part of the district north of Lucena, and if possible to the top of Mount Banahao (5,000 feet), and, second, an inspection trip to other districts in which marking has been done.

VI.—FOREST STATIONS.

There are two stations in this district, one at Lucena and the other at Unisan.

VII.—FIRE PROTECTION.

A few fires were started to clear up old "cainĝins" in the months of March and April, but no damage was done to the surrounding forests. Firewardens will not be necessary here, as the forest is always damp, even in the dry season, and in several instances where fire had been started to burn over grass land it stopped as soon as it reached the forest.

VIII.—RECOMMENDATIONS.

Foresters should have more authority. They should be able to grant timber licenses and gratuitous licenses for public use up to at least 2,000 cubic feet, and an unlimited amount of firewood licenses and all licenses for other minor forest products. The foresters are on the ground and know better how much to grant in each case than the main office at Manila.

Further, foresters should have authority to place the rangers assigned to their districts in places where they may be used to the greatest advantage.

The more intelligent of the rangers should be instructed so that they will be able to do some marking under the direction of the forester.

The licensees should be allowed to cut a certain amount of third and fourth group trees, even if they are not marked.

If the taxes on timber are to be decreased in some districts, the reduction should not be made equal for all trees, but those of the superior and first groups should remain the same, those of the second group reduced 25 per cent, and the remainder 50 per cent. This would induce the licensees to cut more of the inferior species.

The name "superior group" should be abolished and this group called "first group," as the natives always confuse these two groups, calling the "superior group" "first group."

A better kind of marking ax should be furnished, those in use at present being useless after a few days' work.

A bulletin should be published giving the result of all timber tests made during the last two years, as it is very probable that some of the trees which are not in the market at present can be used for some purpose.

Finally, the metric system should be adopted exclusively. At present the measurements made by the foresters are in English feet, the timber is measured in Spanish feet, and the firewood in meters. The metric system was made legal in the United States in 1866, and its use will probably be eventually universal. Errors in cubication would be less frequent, and as the natives are partly accustomed to the meter they could certainly learn its use more readily than the complicated English system.

W. KLEMME, *Forester.*

LAMAO FOREST RESERVE.

The Lamao Forest Reserve was set aside by proclamation of the civil governor July 26, 1904.

Work was begun by this bureau in the Lamao Valley in August, 1903, since which time three nurseries have been started, type areas established, and roads built, nearly all of which have been carried on under the supervision of Mr. Thomas L. Richmond, who possesses a good knowledge of botany, scientific agriculture, and nursery work. His assistant, Mr. William P. Sherlock, is also very capable and is competent to take charge of the routine work of the stations in the absence of Mr. Richmond, who will leave about the middle of September on a six weeks' tour of Singapore, Java, and Ceylon, for the purpose of studying nursery work in the Tropics. Much valuable information and time may be gained from the experience of others who



SKIDDING SLED USED BY AMERICAN LUMBERMEN, MINDORO.



METHOD OF MARKING TREES ON THE TYPE AREA, LAMAO FOREST RESERVE.



METHOD OF CLIMBING VERY LARGE AND HIGH TREES IN COLLECTING BOTANICAL MATERIAL, PALAC PALAC (PALAQUIUM LATIFOLIUM, BLANCO), LAMAO FOREST RESERVE.

have worked out the problems which now confront us, and careful observations will be made regarding every detail of nursery work, methods of preparation of seeds and plants for shipment, garden implements, sprays, etc. He will also make arrangements with botanical gardens and like institutions for the exchange of seeds and plants. Careful notes will be made regarding the character of the working reference library at each of these places in order that suitable working libraries may be secured for the station at Lamao and other points in the islands where forest reserves may be set aside and nurseries started.

The services of Mr. Thomas Hanley, an experienced landscape gardener, have recently been secured, and he will, under Mr. Richmond's supervision, improve the appearance of the reserve, beginning his work near the beach station.

Between 15 and 20 Filipinos are employed in the regular nursery work; the botanical collector has 3 Filipino assistants, and Mr. Hanley 6.

At present a field party of 4 is making a map of the reserve, showing the location of the holdings claimed by private parties in order that said claims may be adjudicated before the court of land registration.

A botanical survey of the reserve has been planned and started by the bureau of government laboratories; the botanist of the bureau of government laboratories and the cooperation of the employees of this bureau carrying on the work. The plan outlined is as follows:

1. A land survey showing boundaries, etc.
2. An ecological survey showing the various plant societies and cultivated areas. This is to be accompanied by a colored map. A careful land survey will give best results.
3. The physiographic relations of these societies to each other.
4. Climatic conditions, soil, other factors and their physiological importance.
5. A careful survey of the very limited areas in each society showing actual distribution of trees and numerical importance of each.
6. The relation of animal life to vegetation, such as influence of swine, etc., on soil, etc.
7. Humus conditions and its relation to vegetation.
8. Photographs of various plant societies, individual plants, etc.
9. Study of silviculture, habits of principal forest trees, seedling conditions, relations to moisture, etc.
10. Systematic descriptions, with key of tree, and, if practicable, other species in the area.
11. Economic plants; agricultural and forestry conditions.

The following is an interesting extract from a letter of Mr. Copeland, botanist in the bureau of government laboratories, to the superintendent of the same:

FEBRUARY 5, 1904.

Dr. PAUL C. FREER,
Superintendent of Laboratories.

DEAR SIR: Pursuant to your informal request for a statement on the subject of our need of a botanical garden, and of the desirability of the Lamao River Valley as its site, I have the honor to submit the following:

* * * * * * *

If the garden were located in the valley of the Lamao River, Mount Mariveles would be a part of its resources, and I include it among the advantages of the site. It furnishes a range in altitude of nearly a mile, and with this a considerable range in temperature, and a very

great one in that much more important element of a Philippine plant, the moisture. At every altitude there is virgin forest, with all the wealth of tropical vegetation which that implies, thriving without delay or expense to us, better than it could ever be made to do in an artificial garden. Practically all the surrounding country is already owned by this government. The proximity to Manila is all that can be expected of such a tract of virgin forest, and as happens, everywhere its accessibility will increase with the need of it. There is abundant water, and irrigation is possible with almost no expense.

More important than any other one reason for locating the botanical garden in the valley of the Lamao is its already having been chosen for the most careful work of the bureau of forestry. The greater usefulness of both the bureau of forestry and the botanical garden are dependent on their not merely respecting each other's rights, but in their cordial cooperation in the furtherance of each other's interests. If they are separated, it will be at a needless expense to the government and a sacrifice of the best work of both.

A considerable part of the work of the department of agriculture of the federal government will fall to the botanical garden, rather than to the bureau of agriculture, as the scientific work of the several bureaus is organized here; this includes all the work which demands laboratory facilities and technical botanical training, such as study of the nutrition of plants, their diseases, breeding, and acclimatization. Such work is already well begun by the bureau of forestry.

As evidence of the excellence of this location for the garden and the facilities it offers for work, I will mention some of the lines of work which the material I have found has suggested. The many vines in all the great groups of flowering plants furnish subjects for conclusive experiments on the mechanism of the ascent of water in trees. The numerous epiphytes invite a study of their source of mineral food, our ignorance concerning which is probably the chief difficulty in the way of their cultivation. There is more material than has ever been used for a study of the distribution, mechanism, and function of hydathodes, or water excreting and absorbing organs. Besides all the climbing devices I have ever seen described at least two others occur here; one of these depends upon the setting up of a permanent pressure by a growth curvature, in a way which would be impossible if the current theories on the mechanism of growth here were sufficient. A wild citrus of the neighborhood in its present state is well worthy of cultivation if it will bear well; and at any rate it offers a valuable stock on which to graft more highly developed related fruits; also a race, with which, if necessary, the best California oranges (which will thrive here) may be crossed to produce their excellencies. With the mature native trees at hand young hybrids can be made to flower and show their qualities, by grafting them onto the mature trees, avoiding years of waiting. Similar opportunities for breeding are offered by the native cucurbits, but the most immediate result of work with them will probably explain the diseases attacking introduced melons and squashes. Questions of greater concern to the forestry interests, but demanding the attention of a botanist, are rate and season of native tree growth; its propagation, when, as in the case of Agathis, it is an important matter, and the diseases of timber. The polyporaceæ, the fungi most destructive to timber, are more numerous in this region than anywhere else in the world; and Merulius and Trametes, two most mischievous genera, not hitherto known in the Philippines, I have found in this valley.

Scientists coming to the Tropics for a season's work will come here if facilities are better than they can find elsewhere. I have touched on the advantages only in lines with which I am most familiar. For morphological and systematic work the rich and varied flora present opportunities which can nowhere be excelled. The work of this laboratory has been focussed on the Lamao Valley as nowhere else, and we have scratched the field in but a few places.

For the purely scientific work of the garden the best spot I have found is the uppermost of the clearings made by the bureau of forestry. It is at an elevation of about 330 feet, where a large creek joins the river from the south. The chief of the bureau of forestry has expressed his readiness to turn this clearing over to us, and the work already accomplished will necessitate a very small expenditure to make it answer our immediate needs. For agricultural botany, the best site is certainly between the two stations, where such work is now being undertaken; but the work at all these places is necessary for the interpretation of the results at any one.

The bureau of forestry will erect a suitable house for the botanists and another for the field laboratory and reference herbarium, on a site within the reserve, selected by Mr. Copeland.

There has been more or less confusion existing among the many tree species found throughout the islands, and almost a total lack of data regarding the qualities of any but the better and more common timbers. The various common names applied to different trees are of



TYPE AREA, LAMAO FOREST RESERVE.

No. 97. Panao (Dipterocarpus vernicifluus, Blanco). No. 98. Guijo (Shorea guiso, Blanco). No. 101. Bolong, etc. (Dyospyros pilasanthera, Blanco). No. 102. Tocud lanquit (Polyscias nodosa, Seem). No. 103. Undetermined. No. 114. Alupag (Euphoria cinera, Radlk). No. 115. Lauan (Arisoptera thurifera, Blume).



little value to a forester, in that they vary with different localities in the same province and the same tree has a different name in almost every native dialect. In order that detailed studies of the silvicultural and reproductive features of the important tree species might be made, an experimental tract near Manila seemed desirable and very necessary. Foresters could there become acquainted, within a short time, with the leading species and their main characteristics; facts which in their district work might take years to accumulate could be brought out promptly and many experiments carried on which would be of great value to the service. Such a station would also be valuable in giving new inspectors and foresters a chance to become rapidly acquainted with the forest conditions and methods of forest work in vogue in the islands.

The majority of inspectors are men who, up to the time of taking the position have never done any forest work, and a few weeks training, such as could be secured on the reserve, would render the man of much more value in a short time than could be possible if he secure the necessary knowledge by experience.

Such a tract should comprise a wide range of elevation from sea coast to mountain top, contain virgin forest, different stages of lembered forest, brush lands and open country, present a variety of exposures, and for the proper administration of the same should be situated within a short distance of Manila.

A suitable tract was found in Bataan Province, in the basin of the Lamao and Alangan rivers, where elevations from 0 to 4,500 existed. The distance from Manila by water being but 22 miles, it can be readily reached by launch in three hours.

A botanical collector of the bureau has been stationed there for several months, and is engaged in laying out type areas for the study of individual tree species. These areas are being laid out mainly after the plan followed by the famous botanic garden in Java, a visit having been made to the same by the former botanist of this bureau in order to secure this and other necessary information.

The result of his observations are published in Bulletin No. 1 of the bureau of forestry, entitled "Report on Investigations in Java, 1902."

Work on the first type area at Lamao is well under way, having been started some months ago. It begins about 4 miles back from the coast, at an elevation of 500 feet, and extends up the north side of one ridge and down the other, and also for a distance along the top of the ridge, thus giving several different exposures.

Some 750 trees have been labeled, and more or less botanical and other material secured. Instead of following the Java method of taking a tree at random, it was decided to mark every tree within a certain area. In this way a number of trees of each species, of various sizes, will be frequently included, and studies on the rate of growth and other physiological problems carried on in connection with the type area.

Even with the small amount of work accomplished to date, various new species of trees (about 50) not previously reported from the islands have been identified, among them several of the genus *Palaquium*, which yields gutta-percha, generally of a good grade. The tract promises to be rich in species, and will be especially valuable for instruction purposes later on. In order to improve the native

personnel of the bureau, it is proposed to establish on the reserve, as soon as possible, a forest school for rangers, where instruction in forest work can be systematically carried on. Such a school is essential to existing conditions, as the force of rangers know little of technical forest work, their entire training in the past being bureaucratic rather than toward direct supervision in the forest of logging operations.

For American and European botanists and botanical collectors who plan to work in the Philippines, Lamao is an ideal situation for preliminary work, the location being healthy and the heat not excessive. There they may become acquainted with the Philippine flora, the characteristics of the vegetation, the peculiarities incident to the preparation of botanical material under tropical conditions, how to deal with the natives, and secure other information only to be acquired by experience, which it is well to assimilate before attempting work in regions distant from Manila. The flora of the Lamao region is very rich, and from the various camps the collectors can thoroughly explore the country from the seashore to the top of Mount Mariveles, an elevation of 4,500 feet. Anyone desiring to make botanical or forest investigations will be given full opportunity to do so, and can make their headquarters at any one of the permanent camps.

The vegetation of the coast region, extending back from the seashore for a distance of 3 or 4 miles and to an elevation of 300 or 400 feet above the sea, is very diversified, consisting mostly of shrubs and small trees, bamboo thickets, and open grassy parks rich in herbaceous plants. This country can be readily worked by making headquarters at the lower camp, and from this lower camp, if anyone desires to study the strand flora, the strand region is easily accessible. At a distance of from 3 to 4 miles from the seashore, and at an elevation of about 300 feet, the character of the vegetation abruptly changes. From this point to the summit of the mountain magnificent and unbroken forests occur, especially rich in the species of *Dipterocarpeæ*. These forests bear a marked similarity to the deciduous forests of the northern United States, except, of course, the undergrowth of characteristic tropical plants, such as the palms, screw pines, etc. As one approaches the summit of the mountain there is a second decided change in the character of the vegetation. Trees occur at the very summit, but on the exposed regions and peaks they are very much reduced in size. Everywhere one finds a profusion of epiphytic and terrestrial orchids, ferns, shrubs, and herbaceous plants. Several species of the palms of the genera *Pinanga* and *Calamus* and the pitcher (?) plant (*Nepenthes*) emphasize the tropical character of the vegetation, yet, on the other hand, such genera as *Rubus Rhododendron*, *Clethra*, and others generally characteristic of temperate countries are represented. The trunks of the trees, bowlders, cliffs, and ground in many places are covered with a great profusion of mosses and lichens not found at lower elevation. Especially interesting plants are the species of *Gnetum*, *Podocarpus*, *Agathis*, etc., and several species of plants inhabited by ants, such as *Dischidia pectinoides* and other species, *Polypodium* sp. and *Myrmecodia echinata*.

Trails have been established from sea level to an elevation of 2,000 feet, where a permanent camp and nurseries have been located.



NO. 288. MALACMAC (PALAQUIUM ALEIFERUM, BLANCO). PALAC PALAC (PALAQUIUM LATIFOLUM, BLANCO) (TREE TO THE RIGHT). LAMAO FOREST RESERVE.

No. 288 has been slashed for the collection of gutta percha.



FOREST SCENE IN THE UPPER PART OF LAMAO FOREST RESERVE.



CAMP OF VISITING BOTANISTS, LAMAO FOREST RESERVE.



LAMAO FOREST RESERVE. HOUSE AT LOWER OR FIRST STATION NEAR SEACOAST.

From this place, on the headwaters of the Lamao River, the summit of the mountain is easily accessible, and there is an excellent opportunity to study the rich flora of the upper ridges and summit. If one desires to study the forest flora, a magnificent opportunity is proffered, as near the upper camp a type area has been established, and within it all the trees are numbered and labeled with their native and scientific names.

NOTES ON LAMAO FOREST RESERVE, LAMAO, BATAAN PROVINCE, P. I.

By R. S. WILLIAMS,
Collector, New York Botanical Gardens.

The writer spent a number of months on the Lamao River, and the region proved to be one of much interest to a botanical collector. The lower land near the coast is covered with brush, bamboo, and small trees, but back a mile or two a fine forest begins that extends without interruption to the bush-covered summits of the mountains, at an elevation of something over 4,000 feet. Taken as a whole the trees of this region are not of such great size as often occurs in the Tropics, but they are the easier collecting on that account, and as to variety, there seems to be an endless number of interesting species coming into bloom or fruit in a constant succession almost the year round. Trails, often very ancient, apparently, run in all directions, and the trouble usually is not that one is unable to find a trail to a locality, but to remain on the right trail, especially when returning from a trip. A few roving Negritos are the only inhabitants, and they usually keep well out of sight. Of lower animals, occasionally a small monkey is encountered; also deer and wild pigs. All, however, are very timid animals. Of snakes, my experience here has been very similar to that in Bolivia, namely, they are so rarely met with as to be scarcely worth mentioning. What is perhaps more remarkable, we were not troubled with mosquitoes or other insects that so often make life a torment in tropical countries. There are many kinds of ants, but I have never been badly stung by them, and there are none that at all compare with some of the firey South American species. The nights at 200 or 300 feet elevation are so cool as to require a good single blanket over one, and at 2,000 or 3,000 feet a good double blanket is often needed. At this latter height are fine streams of clear, cool water that almost make ice a superfluous luxury for drinking purposes. On the whole this region is quite an ideal collecting ground for a tropical country, and while its forests are its chief attraction, there are many fine ferns to be obtained, numerous species of the larger fungi are splendidly developed, and mosses are abundant on the upper streams and slopes.

GROUNDS AND LOCATION OF STATIONS.

The reserve contains, approximately, 12,000 acres, extending from sea level to an elevation of 4,500 feet at the highest point. Adjoining the seacoast, for a distance of 3 miles inland, the land is fairly level, varying to moderate slopes toward the base of the ridges. From this point to the top of the mountain the surface is characterized by long and steep ridges, heavily timbered. Along the coast region the timber has been cut away, leaving a dense growth of bamboo, shrubs, and guava bushes. Numerous small clearings are found throughout this region, some of which are cultivated by the natives in bananas, pineapples, and other fruits, but many of these clearings have been deserted and are now spaces overgrown with cogon grass.

The Lamao River, on the south side, and the Alangan River, on the north, furnish an abundant source of water supply for the reserve during the dry season.

Three stations have been established, one on the beach at Lamao, the second 2¼ miles inland, at an elevation of 250 feet above the sea level, and the third 10 miles from the bay, at an altitude of 2,000 feet.

BUILDINGS AND IMPROVEMENTS.

The grounds along the beach will be devoted almost exclusively to ornamental purposes, and the salt marshes nearby will be utilized in the furtherance of this object.

The nipa palm thrives in this locality, is of economic importance, and is very attractive in appearance.

The building at the first station consists of a 2-story frame cottage with two or three smaller buildings used as storerooms. The grounds surrounding the cottage are fenced in, and a good beginning has been made in the way of improving the appearance of the place

by constructing a gravel walk, sodding the yard, and planting a few ornamental shrubs and flowers.

At the second station four houses have been built for the laborers—one dwelling house; a stable, 18 by 40 feet, with shelter room for wagon and implements; a lath propagating house, 15 by 35 feet; and an orchid house, 18 by 45 feet. In addition to the buildings on the grounds a permanent camp, with several small houses, usually occupied by botanical collectors and visiting botanists, has been established on the river about 1 mile above this station.

The grounds and nursery at this station have been fenced in only on the lower side, being partially protected on the upper side by the river.

The construction of canals for irrigating purposes at the first and second stations will be started in October, and when completed will furnish an unlimted amount of water for nursery work. The length of the main ditch at the first station will be about 1,400 yards, including the ditch through the gardens. There are several streams between the grounds at the point at which the water will be taken from the river, so that flumes will have to be constructed across these streams. The length of the ditch at the second station will not exceed 800 yards, as it is not necessary to go a greater distance up the river to get ample fall to carry the water, and only one flume will be required.

Most of the material used in the construction of buildings and in making improvements was secured on the reserve, thus saving cost and transportation.

Early in the spring a wagon road was constructed from the first to the second station, and three bridges were built over the intervening streams.

This road has been extended to the third station, but is not in condition to travel with vehicles beyond the second station, as the steep hills and narrow ridges encountered toward the top of the mountain make the construction of a roadway for wagons too expensive an undertaking for the present. The present road furnishes a very good pathway for pack trains, and answers all the requirements for the time being. It is planned to continue the trail to the top of the mountain at an early date for the use of botanists and collectors who may wish to work in that region.

Two small houses were recently built at the third station, a tract of land cleared and several acres planted in fruit trees and nursery stock, a large part of the imported nursery stock being put out at this station. After getting the work well under way a reliable Filipino was placed in charge, who is competent to take care of the nursery and orchard under proper direction.

The grounds of the third station at 2,000 feet elevation can not be irrigated so easily as at the lower stations. The small stream from which the supply of water will have to be secured is 40 or 50 feet below the level of the grounds, and it will be necessary to raise the water by mechanical means, and pipe it to the grounds.

NURSERY.

Including recent plantings there are over 500 species in the nursery, the larger proportion of which are native timber trees, and plants of economic importance. In addition, the list comprises a general collection of ornamental shade trees, palms, orchids, ferns, and flowers.

The native species were collected almost entirely by employees of this bureau, but some contributions have been made by botanists of the bureau of government laboratories while collecting in this province. Special effort has been directed to increase the number of native timber trees, and a circular letter issued requiring all employees in the field to make collections of seeds for this purpose. By this means our collection steadily grows in volume, and the condition in which seeds are received afford valuable information as to the requirements of the various species.

At the nursery, notes are taken on the work along the following lines:

1. Time and conditions required for germination by the various species.
2. Effect of light and shade; depth of planting; rate of growth.
3. Insects and fungi affecting seeds and seedlings.

From this record it has been found that the period required for germination varies in different species from a few days to months. The germination of certain species like Acle, and Tindalo may be considerably hastened, if desirable, by soaking them in hot water for a period of twenty-four hours before planting.

It is a difficult matter to secure sound seed from some of the more common timber trees of this region—notably the *Dipterocarpeæ*. There are many species belonging to this family growing on the reserve from which mature seed have never been collected, as the seed seems to have been destroyed by insects or fungi before reaching maturity. The absence of seedlings under the parent tree may be partly accounted for in this way, though there are, of course, other factors to be considered.

Occasionally seeds are collected which are apparently sound in every respect, yet fail to germinate. A large quantity of seed was collected from Banaba trees growing on the



DWELLING HOUSE OF NURSERYMAN IN CHARGE STATION NO. 2, LAMAO FOREST RESERVE.

reserve; no seed at all germinated from some of the trees, and only a small per cent from some of the others, the explanation seeming to be that trees of certain localities do not bear fertile seed. It has been observed that seed of others—the Alupag (*Nephelium litchi*), for example, must be planted soon after falling from the tree in order to secure the germination of the same. It is believed that further investigations along this line will be of some value in studying the distribution of timber in the natural forests and help to explain facts not clearly understood at this time.

Exchanges have been made with several botanical gardens in the East by means of which we have increased our list of plants, and introduced new plants into the islands, some of which at least will prove of economical value.

Seeds desired for exchange purposes are laid aside from each collection.

TROPICAL FRUITS.

An ideal location near the markets of Manila naturally suggested, in connection with forestry work, the inauguration of a few experiments in tropical fruit culture, with a view to improving the native varieties and introducing new fruits.

Many excellent fruits are found in the Philippine Islands, growing in a comparatively wild state, and hitherto little, if any, effort has been made to improve them. Large tracts of land on the reserve are well suited to growing mangoes, cocoanuts, bananas, pineapples, and other fruits, and in proof of this statement it is only necessary to point to the groves of such fruits growing, with little attention and no cultivation, on the reserve.

A large area has been planted with selected varieties of bananas and pineapples, the pineapples being planted between the rows of bananas, the latter being intended to furnish the required shade for the former. The soil in this plot is a good sandy loam, and was thoroughly prepared before planting. Seven hundred papaya seedlings were put out on the same plot, 200 of which were grown from seed of an Indian variety which are equal in flavor, and more than twice as large as the native.

We are growing two varieties of Honolulu bananas, but these have not proved to be equal to the best native varieties.

For comparison with native pineapples, we have three of the best varieties from Ceylon, one of which (giant kew) is said to produce fruits weighing 40 pounds.

Seedlings in considerable quantities of the following fruits are growing in the nursery: Oranges, lemons, anonas, cocoanuts, chico, cashew nut, and others of less importance.

The mango, is without question the best of all tropical fruits, and although a native of India, travelers assert that it reaches its best development in the Philippines. Like many of the temperate climate fruits, the mango does not come true to seed, hence to propagate the better vareties, it is necessary to graft them, and 5,000 seedlings have been planted for this purpose.

Experiments are being conducted with the native citrus plants; oranges and lemons of a fair quality being grown in many parts of the islands, and it is believed that these fruits can be greatly improved by the propagation of selected trees. Two-year-old seedlings of the "Bontoc" lemon are bearing fruit on the reserve this year.

While it is not advisable to make extensive plantings in the Tropics of fruits from temperate climes, yet there are some worth trying at high altitudes, and a few hardy varieties of deciduous fruits have been imported for this purpose.

In the vicinity of the third station, at an elevation of 2,000 feet, wild raspberries grow in abundance. From this it seems probable that such fruits as blackberries, respberries, and strawberries can be grown. A tract of land has been cleared at this station and two or three acres planted in deciduous fruits, 500 coffee trees, and several of the best varieties of California oranges and lemons. The coffee trees are from hardy dwarf varieties, imported from Java and India, and it is hoped that a variety will be found which will be able to resist the blight diseases which have been so disastrous to the coffee interests of these islands in the past.

FORAGE PLANTS.

Owing to the high prices of hay in the islands, it is important that our own forage be grown on the reserve. From results of the experiments at the Singalong Experiment Station, teosinte (introduced last year by the bureau of agriculture) promises to supply this demand. A crop of 30 tons of free fodder was secured from the first cutting on 1 acre, and eight cuttings were obtained from the trial plots during the year. Our first crop shows that equally as good results can be attained under similar condition.

We are growing six varieties of sugar cane imported from Honolulu with a view of introducing more profitable varieties than are cultivated in the islands at present.

Incidentally some experiments have been conducted with garden vegetables. American sweet potatoes were grown in comparison with the native "camote," the results showing that the American potato is equally as prolific as the native potato and far superior in quality.

INSECTS AND FUNGI.

It is not surprising to find insects abounding where conditions are so favorable for their development. Scale insects are especially numerous, and it is not uncommon to find several species on a single palm. In such cases the general appearance of the plant plainly indicates the injury done by the insects. Fleshy fungi are in evidence on every hand, both in the forest and among the cultivated plants, and further investigation may show that the failure of certain trees, such as the lauan, to develop mature seed is traceable to the effects of some fungus. Among cultivated plants fungus diseases are particularly destructive to melons, squashes, and cucumbers, the failure to introduce improved varieties of watermelons and canteloupes into the islands being no doubt due more to this than to any other cause. The native melons appear to be more resistant to the attack of fungus diseases, but yields a fruit of very inferior quality.

Standard solutions commonly used as sprays in temperate climates can not be applied in the Tropics, and it is a difficult matter to make a spray of sufficient strength to kill insects, particularly scale insects, without severely injuring the foliage of the plants. It is not the purpose of this report to give a lengthy discussion of the subject, but merely to call attention to the importance of this feature of the work.

SOIL ANALYSIS.

Samples of soil from the three stations have been submitted for analysis. The analysis of samples from the first and second stations were made by Mr. A. M. Sanchez, soil physicist of the bureau of agriculture, and samples from the third station by the bureau of government laboratories, the following results being obtained:

Parts per million of oven-dried soil.

	Phosphoric acid (P_2O_5).	Nitric acid (N_2O_3).	Potassium (K).	Calcium (Ca).
Station No. 1	31.50	52.50	8.40	39.37
Station No. 2	22.45	8.55	7.11	20.15

STATION NO. 3.—*Analysis by bureau of government laboratories.*

	Sample No. 1.		Sample No. 2.	
	Top soil.	Subsoil.	Top soil.	Subsoil.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Moisture	9.300	9.060	9.040	9.440
Loss on ignition	17.910	12.720	13.360	15.630
N	.305	.187	.137	.172
CaO	.210	.120	.006	.210
P_2O_5	.155	.101	.083	.113
Na_2O	.337	.259	.249	.212
K_2O	.084	.044	.034	.098
Fine earth	74.400	77.700	69.000	70.800

LABOR.

The natives in this part of the province generally follow the occupation of hunting and fishing, and since both game and fish are abundant, they find no difficulty in making an easy living in this way. Some trouble, therefore, was encountered at first in getting reliable workmen, who had to be secured in adjoining provinces.

The force now employed is doing very satisfactory work, and is paid at the rate of 18 to 24 pesos per month, without board. Laborers could be employed perhaps for a little less money, but the nature of the work requires reliability, and experience has shown that cheaper labor can not be depended upon.

The plants in the following list, including both the native and foreign tree and plant species, are those which have been planted in the nurseries at Lamao during the last few months:



PANAO (DIPTEROCARPUS VERNICIFLUUS, BLANCO), LAMAO FOREST RESERVE.

NATIVE TIMBER TREES.

Scientific name.	Common name.	Scientific name.	Common name.
Pithecolobium acle	Acle.	Terminalia calamansanay	Suho suho.
Pithecolobium dulce	Camanchile.	Pygeum latifolium	Aning ñg - ay.
Eugenia sp		Pithecolobium lobatum	Anagap.
Cordia subcordata	Banalo.	Canarium	Pili.
Ormosia calavensis	Bahay.		Sinsi.
Afzelia rhomboidea	Tindalo.	Myristica cumingii	Malatalang.
Mimosops elengi	Cabiqui.	Cambretum squamosum	Malatumbaga.
Cassia javanica	Caña pistula.	Moringa olifera	Balumggay.
Parkia roxburghii	Cupang.	Dipterocarpus grandiflora	Apitong.
Cæsalpinia sappan	Sibucao.		Llamog.
Albizzia retusa	Languil.	Koordersiodendron pinnatum	Amogio.
Oroxylum indicum	Pincapincahan.		Tambalac.
Albizzia saponaria	Languil.		Malaruhat.
Afzelia bijuga	Ipil.		Na puti.
Garcinia	Piris.	Canarium luzonicum	Pili.
	Paitan.	Dracontomelon mangiferum	Lamio.
Garcinia binucao	Bilucao.	Calophyllum inophyllum	Palo maria.
Canarium sp	Salong.		Malasomat.
Pterocymbium javanicum	Mala sapsap.		Maloc maloc.
Diospyros pilosanthera	Bolongeta.	Litsea chinensis	Puso puso.
	Malacamanga.	Artocarpus oderatissima	Anubing.
Bridelia stipularis	Lubalub.	Dipterocarpus mayapis	Mayapis.
Terminalia calamansanay	Balumgao.		

IMPORTED TIMBER TREES.

Scientific name.	Common name.	Whence imported.
Santalum album	Sandal wood	
Stercuñia acuminnata		Ceylon.
Tristania laurinia	Water gum	Do.
Stranela sudlichon	Black cypress pine	Do.
Eucalyptus behrina		Australia.
Eucalyptus rostrata	Murray red gum	Do.
Eucalyptus maculata		Sibpur.
Eucalyptus diversicolor	Kaingum	Australia.
Eucalyptus robusta	Swamp mahogany	Sibpur.
Eucalyptus citriodora	Lemon-scented gum	Australia.
Eucalyptus marginata	Zarrah	Sibpur.
Eucalyptus resinfera	Red gum of South Wales	
Eucalyptus amygdalena	Peppermint gum	Australia.
Eucalyptus corynocalyx	Sugar gum	Do.
Eucalyptus globosus	Blue gum	Do.
Eucalyptus eximia		Do.
Eucalyptus sideraphloca	Red iron bark	Do.
Eucalyptus pilularis	Black butt	Do.
Eucalyptus tereticumis	Forest red gum	Ceylon.
Tristania laurenia	Water gum	Do.
Melaleuca leucadendron	Teak tree	Do.
Syncarpia laurefolia	Turpentine tree	Do.
Casurina glauca	Oleasia	Australia.
Albizzia lucida		Sibpur.
Dalbergia sissoo		Do.
Thesperia populnea	Tulip half tree	Do.
Manibot glazionii	Ceara rubber	Ceylon.
Hevea brasiliensis	Para rubber	Do.
Ficus elastica	East India rubber	Do.
Castilloa elastica	Central American rubber	Do.
Sterculia acerifolia		Australia.
Callitris verrucosa		

NATIVE ORNAMENTAL TREES.

Scientific name.	Common name.	Scientific name.	Common name.
Poinciana regia	Fire tree.	Pithecolobium saman	Rain tree.
Cæsalpinia pulcherrima	Caballero.	Orania philippinensis	Barangoi.
Cassia florida	Acacia.	Sterculia fœtida	Calumpang.
Lagerstroemia speciosa	Banaba.	Bixa orellana	Achiote.
Leucæna glauca	Ipil falso.	Jatropha curcus	Tuba.
Pandanus	Pandan.	Jatropha multifida	Mavia.
Erythrina indica	Dapdap.	Cananga odorata	Ilang-ilang.
Areca carechu	Betel nut palm.	Sesbania grandiflora	Caturai.
Caryota cumingiana	Taguipan.		

IMPORTED ORNAMENTAL TREES.

Scientific name.	Common name.	Whence imported.
Acacia arabica	Acacia	Ceylon.
Acacia decurrens	do	Do.
Grevillia robusta	Silky oak	Do.
Aleurites cordata		Hongkong.
Kadsura chinensis		Do.
Heteropanas grageans		Do.
Albizzia lebbek		Do.
Enkianthus quinque floras		Do.
Rhodalia championi		Do.
Bauhinia acuminata		Do.
Cæsalpinia nuga		Do.
Tea oil tree		Do.
Cancellia		Do.
Stillingia sebriferum	Paper mulberry	Ceylon.
Peltaphorum ferrigineum		Do.
Cinnamomum camphora	Camphor tree	Japan.
Swietenia macrophylla	Mahogany	Sibpur.
Cæsalpinia		Australia.

NATIVE ORNAMENTAL PLANTS AND FLOWERS.

Scientific name.	Common name.	Scientific name.	Common name.
Crinum asiaticum	Crinum.	Codiacum variagatum	Codeum.
Crinum gigantum	Do.	Justicia gardenia	Gardenia.
Canna iridiflora	Canna.	Panax fruticosum	
Canna variegata	Do.	Boehmeria nivera	Rami.
Rosa sp	Native rose.	Graptophyllum hortense	
Plumeria maritima		Gardenia florida	Sulipa.
Orchids, 100 sp	Not identified.	Hibiscus rosa sinensis	Hibiscus.
Ferns, 20 sp	Do.	Hibiscus tricolor	Do.
Asplenium nidus	Bird's-nest fern.	Hibiscus ruber plenus	Do.
Asparagus plumosus nanus	Asparagus fern.	Hibiscus creuntes ninatus	Do.
Caladium sp	Caladium.	Aralia cordata	Aralia.
Viola cornuta	Violet.	Cordyline terminalis	
Caladium bulbosum	Caladium.	Asparagus plumosus blampeldi	Asparagus fern
Colocasia indica	Do.	Laurus camphora	Camphor.
Colocasia antiquarium	Do.	Plumiera acutifolia	Calasusi.
Begonia rex	Begonia.	Alternanthera paronchiodes	Border plant.
Begonia rosea	Do.	Cudrania javanensis	Tahid la buyo.
Colcus barbatus	Colcus.	Psychotria tacpo	Tagpo.
Ipomoea canaca	Convalvulus.	Bridelia	Lando.
Ipomoea sp	Cypress vine.	Gliricidia maculata	Cacauate.
Thunbergia grandiflora		Abrus precatorius	Pagasaga or wild licorice.
Clitoria ternatea	Calocanting.		
Jasminium sambac	Sampaguita.	Celosia sp	Coxcomb.
Lonicera	Honeysuckle.		

IMPORTED ORNAMENTAL PLANTS AND FLOWERS.

Scientific name.	Common name.	Whence imported.
Azalia japonica	Japonica	Japan.
Paeonia officinalis	Peony	Do.
Chrysanthemum frutescens	Chrysanthemum	Do.
Magnolia grandiflora	Magnolia	Do.
Hydrangea hortensis	Hydrangea	Do.
Camellia japonica	Camellia	Do.
Calycanthus	Calycanthus	California.
Deutzia crenata	Deutzia	Do.
Spiraea digitata	Spirea	Do.
Clematis hybrida	Clematis	Do.
Lonicera	Honeysuckle	Do.
He dera	Ivy	Do.
Wisteria chinensis	Wisteria	Do.
Rosa sp	Roses	Do.
Prunus sp	Flowering almonds	Do.
Grape myrtle	Grape myrtle	Do.
Ampelopsis quinquefolia	Ampelopsis	Do.
Bignonia argyraca	Bignonia	Do.
Lonicera	Honeysuckle, variegated	Do.
Dolichos lablab	Purpurea	Australia.
Dolichos sp	Punees Helen	Do.

NATIVE FRUITS.

Scientific name.	Common name.	Scientific name.	Common name.
Ananassa sativa	Piña.	Streblus asper	Calius.
Anona squamosa	Ates.	Memecylon edule	Coles.
Anona muricata	Sour sop.	Mangifera altissima	Paho.
Psidium guayaba	Guayaba.	Spondius mangifera	Alubihon.
Diospyros discolor	Mabolo.	Spondius purpurea	Sirihuelas.
Mangifera indica	Mango.	Cocos nucifera	Cocoanut.
Citrus medica	Bimón, Buyag.	Eugenia jambolana	Duhat.
Citrus aurantium	Orange, Suha.	Euphoria cinerea	Alupag.
Musa sapientium	Banana.	Muntingia Calabura	Cerezas.
Artocarpus integrifolia	Jak fruit.	Manihot utilissima	Gamoting cahoy.
Tamarindus indicus	Tamarind.	Anacardium occidentale	Casoy.
Carica papaya	Papaya.	Sandoricum indicum	Santol.
Achras sapota	Chico.	Artocarpus incisa	Latuan.
Terminalia catappa	Talisai.	Terminalia edulis	Calumpit.

IMPORTED FRUITS.

Scientific name.	Common name.	Whence imported.
Citrus nobilis	Orange	Japan.
Citrus aurantium	do	California.
Diospyros kaki	Persimmon	Japan.
Prunus pseudo	Plum	Do.
Alca smapaca	Olive	California.
Musa cavendishii	Banana	Honolulu.
Coffea arabica	Coffee	Ceylon.
Ficus carica	Fig	California.
Rubus villosus	Blackberry	Do.
Rubus invedus	Raspberry	Do.
Ribes rubium	Currant	Do.
Prunis persica	Peach	Do.
Nigrus communis	Pear	Do.
Prunis amygdalus	Almond	Do.
Hicoria pecan	Pecan	Do.
Castanea verca	Chestnut	Do.
Punica granatum	Pomegranate	Do.
Citrus aurantium	Orange	Do.
Citrus medica	Lemon	Do.
Persea gratissima	Alligator pear	Honolulu.
Aleurites triloba	Candle nut	Ceylon.
Amanassa sativa	Pineapple	Do.

MISCELLANEOUS PLANTS AND NATIVE VEGETABLES.

Scientific name.	Common name.	Scientific name.	Common name.
Musa textilis	Abaca.	Zea mays	Corn.
Ipomoea batatas	Sweet potato.	Sesamum indica	Languis.
Cucurbita maxima	Squash.	Diospyros pilosanthera	Bolongeta.
Citrulus vulgaris	Watermelon.	Gnetum gnemon	Coliat.
Solanum melongena	Eggplant.	Aleurites trisperma	Bulacanag, Bitae gubat, Malacap.
Lycopersicum esculentum	Tomatoes.		
Phaseolus vulgaris	Patani.		

FORAGE PLANTS, FIBERS, AND IMPORTED VEGETABLES.

Scientific name.	Common name.	Whence imported.
Artriplex numularis	Salt bush	Australia.
Euchlaena luxurians	Tlosinte	America.
Sorghum vulgare	Sorghum	Do.
Saccharum officinarum	Sugar cane, 6 varieties	Honolulu.
Gossypium harbaceum	Cotton	America.
Asparagus officinalis	Asparagus	Do.
Bata vulgaris hortensis	Beets	Do.
Lactuca sativa	Lettuce	Do.
Ipomoea batatas	Sweet potato	Do.
Curcurbita melapepo	Pumpkin	Do.
Solanum melangena	Eggplant	Do.
Dycopersicum esculentum	Tomato	Do.
Hibiscus esculentum	Okra	Do.
Phaseolus vulgaris	Lima bean	Do.
Zea mays	Corn	Do.
Vigna catjang	Field peas	Do.

TIMBER-TESTING LABORATORY AND WORKSHOP.

The work of the laboratory and workshop during the first half of the year was devoted largely to the preparation of the forest exhibit for the Louisiana Purchase Exposition. The work was nearly all hand work, the wood-working machines not having been installed until late in February.

The testing of timber was suspended to a large extent during the preparation of the forest exhibit and was resumed late in April, since which time it has progressed very satisfactorily to the present date. Up to April 22, 1904, 150 tests had been made of 82 different species. The results have been tabulated and attached hereto. Since April 22 the work of timber testing has been under the supervision of Mr. Rolland Gardner, who has made 113 tests on 58 kinds of woods, of which tests 46 were made on 13 different species of Borneo woods. The results of the two above sets have been tabulated and attached hereto. These tests being made from a small number of specimens of each kind of wood, are merely approximations, but a more complete and systematic series of tests have recently been inaugurated. One hundred specimens, 4½ by 4½ inches by 6 feet, of each of the six leading native construction woods have been secured from Manila markets and tests on the same will be started at once. Specimens of the same will also be secured from different provinces. Complete data concerning each will be noted, including botanical and silvicultural notes, location of forest from which specimen is secured, photographs showing tree form, bark, etc., as well as the uses of wood, prevailing prices in the log, and of the manufactured lumber, etc.

The statistics compiled by this bureau show that during the past four years more than 700 kinds of native woods have entered the Manila market. Of this large number, 37 species represent fully 75 per cent of the total amount marketed. Complete tests of these leading woods will be made within the next two years, but with the limited force at our command the tests on the first 20 can not be completed until June, 1905. As complete results are obtained it is the intention to publish the same in bulletin form, along with complete notes on the silvicultural characteristics of the tree species, uses to which the timber is put, character of by-products yielded by the tree or bark, and any other information available from a botanical or forestal point of view. In testing woods the methods adopted by the United States Government will be followed as far as practicable.

Sets of wood samples have been prepared of more than 80 species which have been botanically determined and the same will be distributed to scientific and other institutions in the near future. As a rule, a section 3 feet in length of the log which is sent in with the botanical material is taken and placed in the exhibition room in the laboratory. This section is so cut as to expose the sapwood and heartwood in plane surface and in cross section.

One fact was noted in examining the native construction woods for moisture contents, viz, the woods that are used in ordinary construction in Manila are not seasoned, but are put into use immediately on being brought in from the forest. A recent test on a piece of "lauan" showed that it contained 73 per cent moisture, and a large number of pieces in the average lumber yard in Manila will show from 40 to 60 per cent moisture.



TAGATOY (PALAQUIUM LUZONIENSE, VIDAL). NO. A-3 ON TYPE AREA, LAMAO FOREST RESERVE.

A fairly complete set of woodworking machines was received from the United States in February and installed in the workshop. Since that time the work in the shop has progressed rapidly and with excellent results, the receipts for work done amounting to about ₱3,000 during the last five months, and in a short time the shop will be able to place itself on a paying basis.

This shop was established with two objects in view: First, to show the value and beauty of our more important woods and to find uses for woods which are not popular at present in the market, but which are found in abundance in the forests of the islands; second, to train Filipinos as carpenters and as cabinetmakers, and also to teach them the use of different wood-working machines. The second object has not been successfully attained, due to the fact that the workmen will not remain long enough in one position to thoroughly master his work. This constant change of workmen suggested the idea of combining the work of this shop with the proposed furniture factory to be started at Bilibid prison in Manila. This change has been approved and our three master cabinetmakers will, after October 1, transfer all our woodworking machines and supplies to Bilibid, and, combined with the machines ordered from the United States for the furniture factory and with the assistance of a large force of prisoners, they should be in a position to accomplish results much more rapidly than is possible in the present workshop.

A recent inventory gives the value of the wood-working machines at ₱11,622.69; value of supplies, not including lumber and logs, ₱3,546.96; value of lumber and logs in the yard and in the kiln, ₱3,015.21.

Table of results obtained at the Bureau of Forestry timber-testing laboratory, Manila, P. I., during the period June 1, 1902, to January 28, 1904.

No.	Common name.	Botanical name.	Date of test.	Compression endwise.	Compression sidewise.	Cross bending.			Strength in tension.	Strength in shear.	Specific gravity of beam.
						Strength at elastic limit.	Strength at rupture.	Modulus of elasticity.			
				Lbs. per sq. in.	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	
1	Acle	Pithecolobium acle	Feb. 10, 1903	5,490		6,960	9,030	1,076,000	10,720		0.67
2a	Agoho	Casuarina equisetifolia	July 6, 1903	12,890	1,930	11,500	13,500	1,674,000	16,480	940	.96
2b	do	do	June 22, 1903	12,550	4,340	9,650	10,800	2,102,000	21,890	590	1.08
3c	do	do	do	11,260	4,490	9,260	10,200	1,429,000	13,550	660	1.02
3a	Alupag	Nephelium longana	Nov. 20, 1902	15,110		17,620	19,700	2,448,000	17,600		.96
3b	do	do									
4	Amuguis	Koordersiodendron celebicum	Aug. 11, 1903			10,910	15,500	1,567,000			.82
5a	Anilao	Columbia blancoi	Apr. 2, 1903	5,140		8,390	8,390	1,034,000		440	.46
5b	do	Columbia serratifolia	Dec 3, 1902	2,930		2,080	2,080	502,000	2,190		.42
6a	Apitong	Dipterocarpus grandiflorus	Sept. 17, 1902	5,100		5,960	8,420	1,755,000	9,250		.72
6b	do	do	Sept. 19, 1902	4,630		4,530	9,800	1,625,000	9,290		.70
6c	do	do	Nov. 13, 1902	10,660		10,200	14,580	2,472,000	11,050		.77
6d	do	do	Mar. 9, 1903	8,245	1,850	11,500	16,860	1,870,000		640	.76
6e	do	do	do	8,760	1,790	12,300	14,220	1,670,000		530	.72
6f	do	do	Nov. 21, 1903	6,000		9,830	11,800	1,781,000	13,800		.78
7a	Antipolo	Artocarpus bluemei	Nov. 25, 1903	5,080		4,200	4,680	726,000	5,350		
7b	do	do	Jan. 27, 1904	3,481		3,940	5,340	826,000			
8	Aranga	Homalium villarianum	Mar. 31, 1903	10,030		12,220		2,042,000			.89
9	Balay bayan	Peterospermum diversifolium	Apr. 2, 1903			7,700	8,320	1,369,000		340	.67
10	Balete	Ficus clusioides	Jan. 27, 1904	5,827		11,450	13,280	1,449,300	8,610		
11	Baliti	Ficus indica	Feb. 10, 1903	6,580		5,900	7,110	1,340,000		770	.69
12	Balobo	Diplodiscus paniculatus	Feb. 14, 1903	6,840		5,100	5,660	1,140,000			.63
13	Banalo	Thespesia populnea	Dec. 19, 1902	5,030		7,410	9,260	1,027,000	7,650		.46
14	Bancal	Nauclea	May 12, 1903	7,110	130	5,970	6,450	1,261,000		430	.54
15a	Bancoro	Nauclea blancoi	Nov. 14, 1902	7,640	1,700		12,740				
15b	do	do	Nov. 18, 1902	9,140		11,970	11,970	2,177,000	13,630		.71
15c	do	do	Feb. 10, 1903	8,430		10,660	14,220	1,980,000			.65
16	Bancudo	Morinda bracteata	Jan. 21, 1903	5,310		4,600	7,440	1,096,000		690	.52
17	Bangat	Pterocymbium javanicum	May 22, 1903	1,880	300	2,910	3,740	722,400	4,690	230	.39
18	Banitan	Xylopia dehiscens	Jan. 21, 1903	7,490		4,620		2,134,000	11,920	440	.64
19	Batino	Alstonia macrophylla	Mar. 20, 1903	9,365		10,750	11,000	1,366,000		780	.88
20a	Betis	Azaola betis	Apr. 22, 1903	6,630	1,510	6,460	9,590	1,502,000		360	.93
20b	do	do	June 1, 1903		1,450	6,970	8,340	1,658,000	20,300	940	.90
21	Bibit	Engelhardtia	May 4, 1903	8,690	2,130	9,190	10,310	1,880,000	15,490	710	.95
22	Binonang	Octomeles sumatrana	Jan. 20, 1903			5,250	6,360	958,000	4,675	505	.37
23a	Bitanhol	Calophyllum abernianum	Feb. 13, 1903	9,670		6,730		1,840,000	9,000	610	.81
23b	do	do	July 24, 1903	9,510	2,290	10,450	11,220	2,050,000		580	.74
24	Calamansanay	Terminalia calamansanay	Dec. 3, 1902	10,370					14,410		.73
25	Calantas	Koordersoidendron speciosa	Nov. 11, 1902	6,160		8,280	8,280	1,101,000	7,940		

26a	Calingag	Cinnamomum mercadoi	Nov. 19,1902	5,680		9,100	10,000	1,500,000	10,990		.53
26b	do	do	Dec. 26,1902	5,230	7,700	6,810	6,970	1,335,000			.52
27	Calius	Pinsotia baleri	June 1,1903			11,950	11,950	1,156,000			.67
28a	Calumpit	Terminalia edulis	Aug. 11,1903	6,790	1,600	10,030	10,030	1,077,000		920	.64
28b	do	do	Jan. 28,1904			8,200	8,710	1,613,000	10,400		.64
29	Camagon	Diospyros discolor	Nov. 17,1902	11,465							
30a	Camangulanis	Clausena excauta	May 4,1903	6,850	1,480	6,450	6,450	1,268,000	4,110	530	.61
30b	do	do	do	7,750	1,680	8,690	8,690	1,324,000	4,150	680	.59
31a	Cupang	Parkia roxburghii	Nov. 25,1902	5,480		8,020	9,470	1,471,000	4,850	890	.39
31b	do	do	Dec. 10,1902	4,230		4,790	6,400	879,000	6,750		.43
31c	do	do	Dec. 29,1902	5,190	8,445	6,460	8,920	1,240,000			.38
32	Cupang bondoc	Albizzia	Apr. 27,1903	5,060	724	6,630	6,630	970,000	7,110	480	.59
33	Dayat laya	Mitagne	Jan. 23,1903	10,410		5,630	7,030	1,921,000	9,480	800	.84
34a	Dilang butiqui	Eugenia claviflora	Nov. 21,1902	9,435		12,330	13,780	2,603,000			.94
34b	do	do	Jan. 23,1903	10,120		13,390	19,910	2,158,000	11,420		.87
35	Divalat na atim	Dysoxylum	May 12,1903	7,960	2,440	6,590	6,850	1,452,000	10,100	540	.63
36a	Duguan	Myristica sp	Jan. 27,1904	3,992		5,612	5,884	1,189,000			
36b	do	do	Jan. 28,1904			4,130	4,130	1,674,000			.67
37	Duhat	Syzygium gambolana	Feb. 13,1903	5,930		4,780		787,000			.51
38a	Dungon	Tarrietia silvatica	Mar. 6,1903	7,090		9,720	11,090	1,186,000			.98
38b	do	do	Apr. 17,1903	6,080	3,920	6,540	10,530	1,615,000		660	1.30
39	Dungon late	Heritiera littoralis	July 24,1903			960	4,720	7,660		1,760	.84
40a	Guijo	Shorea guiso	Mar. 6,1903	7,480	2,150	11,720	13,140	2,019,000		650	.89
40b	do	do	Jan. 6,1904	7,480							
41a	Ipil	Afzelia garciae	Apr. 15,1903	6,530	910	7 70	7,170	1,444,000		620	.62
41b	do	do	June 1,1903			4,110	4,110	1,243,000			.59
41c	do	Afzelia bijuga	July 6,1903	8,290	2,270	8,640	8,640	1,527,000	12,670	580	.75
42a	Jarrah	Eucalyptus	Dec. 11,1902	5,980		7,490		1,429,000	14,425		
42b	do	do	Dec. 16,1902	6,060		6,310		1,147,000	12,960		
42c	do	do	Feb. 2,1903	6,130		8,240	11,640	505,000	12,600	1,130	.88
42d	do	do	do	6,970		8,800	12,310	1,600,000	9,240	960	.87
42e	do	do	Mar. 27,1903	8,520		10,000	12,680	1,815,000		460	.80
43	Lanete	Wrightia glabra syn ovata	Sept. 10,1902	6,540		6,100	9,330	1,274,000	9,000		.60
44a	Lauan	Anisoptera thurifera	Mar. 21,1903	3,670	680	5,540	6,720	892,000		500	.67
44b	do	do	May 12,1903	5,980	840	7,530	7,530	1,274,000		360	.49
44c	do	do	do	7,280	1,050	6,350	6,350	1,499,000	10,180	370	.55
44d	do	do	May 22,1903	3,930	910	4,940	6,730	1,182,000	6,180	290	.67
44e	do	do	do	3,930	1,070	5,580	7,620	1,294,000	8,760	260	.65
44f	do	do	July 23,1903	4,970	1,080	9,920	10,560	1,342,000			.52
44g	do	do	July 24,1903	5,610	970	3,920	3,920	1,049,000	10,270		.52
45a	Lisong insic	Sapotacea	June 1,1903	8,250							.74
45b	do	do	June 22,1903	9,150	2,120	7,450	9,790	1,709,000	7,940	530	.72
45c	do	do	do	8,360		6,570	8,350	1,548,000		(?)500	.73
45d	do	do	July 6,1903			7,540	540	1,687 000	12,960		.71
46a	Liucin		June 1,1902			18,470	22,340	2,575,000			1.02
46b	do		Apr. 27,1903	8,210	1,940	8,250	8,250	1,702,000		710	.84
47	Luan(?)	Buchania florida	Jan. 22,1904	5,590		7,400	10,240	1,453,000	5,600	802	.81
48a	Macaasin	Eugenia	Jan. 27,1903	6,390		7,950	11,760	1,855,000	20,120		1.01
48b	do	do	Apr. 2,1903	9,675		10,540	13,250	1,131 000		540	.90
48c	do	do	Apr. 7,1903			12,620	15,780	1,921,000	6,510		.90
48d	do	do	Jan. 28,1904	5,688	1,450	7,900	8,410	1,650,000			.84

Table of results obtained at the Bureau of Forestry timber-testing laboratory, Manila, P. I., during the period June 1, 1902, to January 28, 1904—Continued.

No.	Common name.	Botanical name.	Date of test.	Compression endwise.	Compression sidewise.	Cross bending.			Strength in tension.	Strength in shear.	Specific gravity of beam.
						Strength at elastic limit.	Strength at rupture.	Modulus of elasticity.			
				Lbs. per sq. in.	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	
49	Macaisa	Cleidon javanicum	May 4, 1903	6,710	3,750	5,580	5,580	1,122,000	3,000	390	0.58
50a	Macapali		May 22, 1903	10,340	7,660	14,500	14,500	2,270,000	15,580	550	1.32
50b	do		July 24, 1903			14,530	14,530	2,394,000			1.27
50c	do		do	11,660	6,240	15,040	15,040	3,049,000	14,350	1,540	1.27
51	Magalat	Harpullia blancoi	Feb. 10, 1903	6,210		4,720	6,250	1,560,000	4,760		.72
52	Malabatino	Alstonia	May 12, 1903	7,860		5,670	5,670	1,835,000			.67
53	Malasaguin lalaqui	Vidalia	July 6, 1903	7,570	1,940	4,740	7,860	1,226,000	3,320	450	.74
54	Malatemoyan	Cascaria	Mar. 27, 1903	7,620	3,290	13,200	13,320	1,500,000		690	.73
55	Mambog	Nauclea blancoi	May 6, 1903	5,600		7,470	8,150	1,275,000			.49
56a	Mangasinoro	Fagraea	Feb. 13, 1903	4,130		3,010		1,382,000			.81
56b	do	do	Mar. 31, 1903	4,680	1,200	6,820	8,520	1,253,000	7,010		.69
57	Marumancas na la laque.	Sedesoxylum odoratum	July 24, 1903	11,570	2,610	8,610	8,610	2,175,000		1,010	1.02
58	Molave	Vitex altissima	Mar. 21, 1903	6,450	3,350	9,240	9,910	1,097,000		440	1.12
59	Narra pula	Pterocarpus vidalianus	May 12, 1903	5,990	1,170	4,800	4,800	1,065,000	2,560	330	.44
60a	Paitan		Jan. 6, 1904	3,573							
60b	do		do	3,540							
61a	Palo Maria	Calophyllum inophyllum	Mar. 18, 1903	8,070	2,750	5,770		1,183,000		780	.71
61b	do	do	Jan. 6, 1904	8,070							
61c	do	do	Jan. 8, 1904	4,495							
62a	Palosapis	Dipterocarpus palosapis	Aug. 11, 1903	5,340	1,120	3,210	9,290	844,800		850	.60
62b	do	do	Jan. 22, 1904	7,511	460	11,550	[illegible]550	2,074,850	12,980		.58
63	Palsainguin	Canarium	Jan. 28, 1904			7,220	7,220	1,647,000			.58
64	Pamlasin	Leguminosa	July 24, 1903	7,310		10,940	10,940	1,529,000	7,580	430	.63
65	Pangui	Turpinia	May 4, 1903	5,530	800	4,490	4,490	1,165,000	4,340	230	.55
66a	Parua	Pinus mercusii	Feb. 17, 1903	3,300		6,070	8,400	944,000			.69
66b	do	do	Apr. 23, 1903	8,470		10,710	10,710	1,863,000		300	.63
66c	do	do	Apr. 25, 1903	8,610	1,550	10,180	10,180	1,908,000		600	.61
66d	do	do	June 22, 1903	7,410	1,550	6,200	6,200	1,648,000	11,070	610	.61
66e	do	do	do	6,730	1,390	5,330	5,530	1,108,000	4,840	410	.59
66f	do	do	July 6, 1903	7,560	1,510	9,890	13,480	1,975,000	9,910	590	.66
66g	do	do	do	7,410	1,560	9,520	9,520	1,101,000	11,640	730	.61
67a	Payina	Xylopia blancoi	July 24, 1903	7,750	2,360	7,450	7,450	1,083,000			.72
67b	do	do	do	800	1,090	11,370	11,370	2,170,000	10,300	480	.75
68	Piri pili	Canarium luzoniense	do	4,190		8,370	8,590	990,000		510	.59
69	Redwood, Cal		Sept. 20, 1903	6,235					3,410		
70a	Santol	Sandoricum indicum	May 22, 1903	2,540	1,220	3,080	3,820	434,500	6,330	500	.73
70b	do	do	July 24, 1903			5,730	5,730	66,720			.57

70c	do.....	do.....	Jan.	22, 1904	5,239		5,500	7,606	1,126,000			.50
70d	do.....	do.....	Jan.	28, 1904			7,420	8,950	1,508,000	7,070	555	.54
71	Saguin nang calao.....	Myristica.....	June	1, 1903			5,850	6,255	1,383,000			.48
72a	Supa.....	Sindora wallichii.....	Jan.	23, 1903	7,230		10,580	14,300	2,110,000	11,800	1,350	.90
72b	do.....	do.....	Mar.	18, 1903	10,100	2,530	14,560	15,560	1,838,000		(?)480	.85
73	Talisay.....	Terminalia catappa.....	Jan.	6, 1903	6,070		7,460	10,200	1,137,000	9,670		.72
74	Taloto.....	Pterocymbium javanicum.....	Jan.	22, 1903	4,900		5,770	6,156	227,000	4,710		.35
75	Tangisan.....		Jan.	6, 1904	3,750	1,260						
76	Taquit asin.....	Mallotus moluccanus.....	Jan.	6, 1903	2,860		3,280	3,440	575,000	2,595		.43
77	Tinaan pantay.....		Nov.	17, 1902	8,275					12,860		
78	Tindalo.....	Afzelia rhomboidea.....	Jan.	2, 1903	8,800		8,150	13,200	2,100,000	10,250		.88
79a	Tua.....	Dolichandrone spathacea.....	Nov.	21, 1902	4,120		4,820	5,060	762,000	3,335		
79b	do.....	do.....	Jan.	17, 1903	3,940		4,070	7,930	770,000			.36
80	Tucan calao.....	Aglaia.....	Jan.	30, 1903	7,170		9,090	16,260	1,951,000	17,180		.92
81a	Yacal.....	Hopea plagata.....	Feb.	12, 1903	7,490		9,420	11,680	1,591,000	16,670		.90
81b	do.....	do.....	Feb.	21, 1903			11,250	13,010	1,861,000			1.015
82		Albizzia littoralis.....	Jan.	31, 1903	6,550		9,000	13,640	1,300,000	11,230	540	.60

Remarks.

At the test of Antipolo, No. 7, on November 25, 1903, the average specific gravity of two blocks was found to be 0.49. At the test on January 27, 1904, the average specific gravity of three blocks was found to be 0.47.

At the test of Balete, No. 10, on January 27, 1904, the average specific gravity of five blocks was found to be 1.04.

At the test of Calantas, No. 25, on November 11, 1902, the average specific gravity of two blocks was found to be 0.455.

At the test of Camagon, No. 29, November 17, 1902, the average specific gravity of three blocks was found to be 0.79.

At the test of Jarrah, No. 42, December 11, 1902, the average specific gravity of five blocks was found to be 1.04. At the test on December 16, 1902, the average specific gravity of six blocks was found to be 0.99.

At the test of Paltan, No. 60, on January 6, 1904, the average specific gravity of three blocks was found to be 0.98.

At the test of Palo Maria, No. 61, on January 8, 1904, the average specific gravity of six blocks was found to be 0.87.

At the test of Tua, No. 79, on November 21, 1902, the average specific gravity of two blocks was found to be 0.39.

Results obtained at the bureau of forestry timber-testing laboratory, Manila, P. I., during the period April 28, 1904, to June 30, 1904.

Common name.	Botanical name.	Specific gravity of beam when tested.	Per cent of moisture.	Cross bending.			Compression endwise.	Compression sidewise.	Tension at failure.	Shear along the grain.	Specimens sent from province.
				Stress at elastic limit.	Stress at rupture.	Modulus of elasticity.					
				Lbs. per sq. in.	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	*Lbs. per sq. in.*	
Alupac	Nephelium (?)	1.050	7.00	12,950	12,950	1,985,000	12,870	5,370	14,275	1,826	Zambales.
Do	do	1.000	6.30	8,100	8,950	2,080,000	11,910	4,970	14,400	1,023	Do.
Aninapla	Albizzia lebbek	.710	10.60	8,400	11,650	1,428,000	6,260	1,705	13,150	1,090	
Apitong	Dipterocarpus grandiflorus	.765	10.40	9,000	12,400	1,730,000	6,300	1,725			Do.
Do	do	.795	12.40	10,450	14,450	2,500,000	7,410				Do.
Aranga	Homalium (?)	.810	8.80	9,400	12,600	1,590,000	7,465	2,260			Tayabas.
Aninapla	Albizzia lebbek	.683	10.10	8,200	8,200	1,270,000	6,620	1,655	11,700	1,270	Do.
Bagaa	Sterculia	.510	8.20	6,400	7,300	1,160,000	5,110				Mindoro.
Bahay	Ormosia calavensis	.600	10.00	9,150	11,420	1,470,000	7,140	1,240	15,350	865	Tayabas.
Do	do	.602	10.50	5,700	5,700	1,550,000	6,345	995	6,425	792	Do.
Do	do	.600	10.30	7,700	11,100	1,450,000	6,920	1,540	12,400	705	Do.
Batete	Picus indica	.850	20.70	9,500	12,800	1,620,000	7,370	2,240	17,675	1,127	Masbate.
Bayoc	Pterospermum blumeanum, Korth	.580	10.70	8,950	9,560	1,300,000	6,300	930	12,000		Tayabas.
Do	do	.545	5.30	9,750	1,300	1,880,000	7,840	1,190	13,300	780	Do.
Betis	Palaquium	.615	15.00	6,000	6,000	1,120,000	5,280	1,480	7,125		Do.
Do	do	.720	8.60	9,100	10,400	1,500,000	7,840	2,870	9,350	825	Do.
Bohave	Dysoxylum blancoi, Vidal	.625	8.70	(a)	(a)	1,460,000	4,690	940			Masbate.
Bolongeta	Diospyros pilosanthera, Blanco	.806	16.00	8,050	12,410	2,410,000	5,932	1,365	14,900	670	Zambales.
Bugo	Dracontomelum mangiferum, Blume	.990	68.00	6,850	8,000	1,680,000	3,760	1,570	10,050	550	Masbate.
Calumanog		.700	18.00	7,800	10,500	1,390,000	5,990	1,510	12,975	1,345	Do.
Do	Odina	.708	18.00	6,000	9,000	1,200,000	6,000	1,555	11,025	1,052	Do.
Calumpit	Terminalia edulis, Blanco	.630	3.20	(a)	(a)	1,120,000	6,950			850	Zambales.
Camangsi	(Artocarpus camansi?) Blanco	.740	7.90	7,600	10,000	2,140,000	8,460		17,700	1,500	Tayabas.
Cupang	Parkia roxburgii	.345	10.00	(a)	(a)	800,000	3,425	493	9,175	415	
Do	do	.440	4.30	6,500	8,200	1,140,000	5,440	870		860	Zambales.
Dalindingan		1.020	16.60	12,750	17,400	2,160,000	9,200	2,700	20,650	875	Do.
Duguan	Myristica	.580	12.00	7,200	7,200	1,100,000	4,636	1,180	2,295	(b)	Tayabas.
Do	do	.573	8.20	6,300	6,300	1,260,000	6,275	2,700	8,150	1,120	Do.
Dulitan pula	Palaquium	.600	6.00	9,250	9,250	1,600,000	9,010	1,535	12,425		Do.
Dulitan	Palaquium luzoniense, Vidal	.950	8.50				5,750	1,725	7,885	940	Do.
Guyon guyon	Cratoxylum blancoi	.640		3,550	7,100	1,340,000	(c)	(c)	(c)	(c)	Do.
Hanagdon	Gyrocarpus jacquinii, Roxb	.245	11.00	1,540	1,540	3,200,000	1,635				Do.
Lanutan	Anonaceae	.580	14.00	5,350	7,200	1,100,000	4,500	1,120	7,700	1,345	Do.
Do	do	.575	11.50	5,600	6,800	1,025,000	5,095	1,205	7,950	1,240	Do.
Do		.786	6.40	7,400	9,700	1,890,000	9,975	3,300	18,450	1,285	Do.
Do	Xylopia dehescens, Mer. / blancoi, Vidal	.790	8.50	7,250	11,400	1,790,000	11,035	3,550			Mindoro.
Ligaa	Zizyphus zonulatus	.680	8.70	9,100	9,350	1,560,000	5,270	2,075	9,330	790	Tayabas.

Lingo lingo		.960	8.80	8,700	12,000	1,860,000	7,740	3,525		1,620	Zambales.
Do		.570	9.50	6,500	8,000	1,370,000	5,690	2,075		365	Do.
Lisac	Naucleа glaberrima	.520	12.00	7,100	8,700	1,506,000	5,575	978	8,200	865	Tayabas.
Macaasin	Eugenia	.570	11.00	5,650	5,650	1,113,000	4,556	1,105	7,150	945	Do.
Do	Eugenia (operculata)?	.910	25.00	9,200	12,740	1,550,000	6,470	2,015	15,000	890	Do.
Do	Eugenia?	.925	29.00	7,700	11,100	1,760,000	5,080	1,915	18,450	600	Masbate.
Malá-banuyo or Malaiba.		.486	6.50	5,450	6,550	911,000	4,780		5,300	605	Tayabas.
Malacadios	Myristica	.805	28.00	6,600	7,260	2,660,000	6,776		14,800	642	Do.
Do	do	.800	10.30	9,800	13,600	2,250,000	7,100				Camarines.
Malapaho	Mangifera	.655	3.90	9,500	12,000	1,700,000	7,650	1,875		775	Zambales.
Malapali or Macapali		1.260	7.60	15,500	15,500	2,740,000	13,590				
Malapuyao	Cymometra	.935	12.00	9,380	10,830	2,500,000	8,120	3,100	13,000	1,140	Tayabas.
Malasageum puti	Aglaia	.765	12.00			1,623,000	6,640	1,730	13,600	1,270	Do.
Malugay		.590	12.00	7,450	9,330	1,220,000	5,530	1,080	8,500	560	
Maragabulo		.780	7.80	12,000	16,200	2,450,000	10,275			1,020	Do.
Mili mili	Canarium	.720	13.20	8,650	13,000	1,800,000	6,900	1,605	8,500	650	Masbate.
Do	do	.750	21.80	7,300	10,600	1,550,000	5,930	1,290	13,150	550	Do.
Do	do	.588	12.00	6,900	7,940	1,365,000	5,440	1,370	9,500	570	Do.
Pagsainguin	Canarium luzonicense	.600	8.90	9,050	10,200	1,530,000	5,850				Zambales.
Pangunpanguin		.915	12.00	20,000	12,500	2,700,000	9,235				Do.
Pili	Canarium luzonicum, Miq	.570	11.00	6,300	8,450	1,715,000	5,900	1,080	6,825	651	Masbate.
Do	do	.630	10.10	7,600	9,500	1,530,000	5,915	1,490	5,250	740	Tayabas.
Do	do	.570	9.70	6,740	9,400	1,700,000	5,640	1,365	10,260	570	Masbate.
Tambon tambon	Parinarium salicifolium, Miq	.770	10.50	8,400	10,700	1,860,000	6,315	2,090	14,750	1,115	Do.
Do	do	.814	12.00	8,250	11,800	1,750,000	7,260	2,425	13,450	938	Do.
Tomauyan		.638	12.40	7,000	7,000	1,328,000				651	

[a] Beam sheared.

[b] Poor piece.

[c] Poor piece, badly checked.

ROLLAND GARDNER,
Engineer Assistant, Timber-Testing Laboratory.

Due to the large amount of Borneo lumber imported into the Philippine Islands during the past year, it has seemed wise to submit the following results of a series of tests made on the same:

TESTS OF THIRTEEN BORNEO WOODS.

The pieces were sawed to 4½ by 4½ inches, and then placed in the dry kiln for about six days, after which they were dressed to 4 by 4 inches.

For the tests in flexure the span in each case was 57 inches and the load was applied at the rate of 0.3 inch per minute.

The elastic limit was taken at the point where a very small increase of load produced 50 per cent greater deflection than the same increase of load produced when the loading of the beam was started. The results given in column "Stress at elastic limit" are the stresses at the outer fibers, in pounds per square inch.

The results given in column "Stress at rupture" are the stresses at the outer fibers in pounds per square inch when failure occurred.

The blocks tested in compression along the grain were 4 by 4 by 8 inches. The results given are in pounds per square inch when failure occurred. The loads were applied at the rate of 0.06 inch per minute.

The shear tests were in double shear along the grain, an area of 3½ square inches being sheared in each case. The results tabulated are in pounds per square inch.

SELANGAN BATU (BORNEO YACAL).

	Moisture.	Specific gravity.		Stress at elastic limit.	Stress at rupture.	Modulus of elasticity.	Compression along grain.	Shear.
		Moist.	Dry wood.					
	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	30.9	0.930	0.710	9,700	12,600	1,880,000	7,640	753
Test No. 2	24.2	.820	.660	9,550	11,800	2,080,000	7,430	673
Test No. 3	27.0	.880	.690	9,730	12,700	2,080,000	7,515	708
Test No. 4	28.5	.885	.696	9,400	12,200	2,070,000	7,085	890
Average			.689	9,600	12,325	2,027,000	7,420	760

PENAGAH.

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	10.8	0.608	0.560	7,780	9,100	1,148,000	5,955	854
Test No. 2	10.8	.675	.625	7,800	8,850	1,060,000	5,985	916
Test No. 3	10.9	.640	.588	8,450	9,700	1,350,000	6,575	900
Test No. 4	14.0	.690	.604	7,480	7,780	1,000,000	5,560	847
Average of Nos. 1, 2, and 4			.594	7,880	8,860	1,140,000	6,020	880

MERABAU (BORNEO IPIL).

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	22.2	1.160	0.950	13,800	18,400	2,475,000	8,425	1,123
Test No. 2	18.2	1.160	.980	15,200	19,200	2,520,000	10,490	872
Test No. 3	33.7	.850	.640	8,380	12,000	1,800,000	7,005	694
Test No. 4	22.6	1.180	.965	13,000	18,900	2,520,000	8,185	1,098
Average of Nos. 1, 2, and 4	(a)		.965	14,000	18,830	2,505,000	9,035	1,030

a The results of test No. 3 were not averaged in with the others, owing to the high per cent of moisture and the low specific gravity of the specimen.

CAMPHOR.

	Moisture.	Specific gravity.		Stress at elastic limit.	Stress at rupture.	Modulus of elasticity.	Compression along grain.	Shear.
		Moist.	Dry wood.					
	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	20.9	0.725	0.600	8,450	11,600	1,960,000	6,810	459
Test No. 2	20.0	.725	.605	8,470	11,300	1,890,000	6,435	539
Test No. 3	20.6	.750	.623	8,850	12,400	2,020,000	6,450	673
Test No. 4	23.3	.750	.610	8,050	10,650	1,730,000	6,450	558
Average			.610	8,455	11,490	1,900,000	6,540	557

BILLIAN (IRONWOOD).

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	28.9	1.120	0.870	16,100	19,700	2,150,000	11,035	598
Test No. 2	22.3	1.200	.980	18,200	21,000	2,570,000	11,910	920
Test No. 3	19.2	1.190	1.000	18,100	22,000	2,565,000	12,025	1,090
Test No. 4	19.7	1.180	.990	13,600	15,950	2,250,000	10,200	970
Average			.96	16,500	20,910	2,384,000	11,290	895

KRUEN.

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	23.4	0.645	0.524	5,770	8,700	1,600,000	4,805	645
Test No. 2	24.5	.680	.547	6,830	9,400	1,800,000	5,195	545
Test No. 3	24.3	.680	.548	5,700	8,100	1,575,000	4,925	857
Test No. 4	18.8	.645	.548	5,640	8,600	1,440,000	4,440	564
Average			.542	5,985	8,700	1,804,000	4,840	653

SERAIAH MIRA (BORNEO CEDAR).

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	15.9	0.564	0.480	5,770	7,600	1,145,000	4,860	734
Test No. 2	15.1	.555	.583	6,370	8,700	1,350,000	5,030	650
Test No. 3	16.1	.570	.490	4,950	6,500	1,350,000	4,845	470
Test No. 4	17.9	.560	.475	5,500	7,000	1,350,000	4,955	603
Average			.482	5,650	7,450	1,299,000	4,920	614

SERAIAH PUTEH.

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	32.2	0.660	0.492	6,300	9,650	1,570,000	5,300	604
Test No. 2	26.1	.610	.485	7,040	9,600	1,528,000	5,225	570
Test No. 3	23.3	.605	.492	6,360	9,400	1,570,000	5,035	470
Test No. 4	31.0	.660	.505	6,700	8,900	1,550,000	5,220	544
Average			.493	6,600	9,390	1,554,000	5,145	547

SELANGAN KACHA.

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	27.4	0.720	0.568	8,700	11,600	1,645,000	6,700	690
Test No. 2	27.3	.710	.560	7,900	10,950	1,770,000	6,655	630
Test No. 3	25.9	.710	.568	8,050	11,200	1,800,000	6,540	570
Test No. 4	28.9	.710	.568	7,700	10,400	1,710,000	6,225	557
Average			.563	8,090	11,040	1,781,000	6,530	612

OBAR SULUK.

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	19.3	0.665	0.560	6,800	8,900	1,150,000	5,040	1,070
Test No. 2	16.6	.690	.595	7,700	108,500	1,440,000	5,450	560
Test No. 3	18.3	.700	.590	5,360	9,580	1,260,000	5,325	883
Average			.582	6,620	9,780	1,283,000	5,270	828

RUNGUS (BORNEO ROSEWOOD).

	Moisture.	Specific gravity.		Stress at elastic limit.	Stress at rupture.	Modulus of elasticity.	Compression along grain.	Shear.
		Moist.	Dry wood.					
	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	28.6	0.68	0.530	7,700	8,700	1,890,000	5,555	633

GAGIL.

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	33.2	0.630	0.424	5,370	7,540	1,350,000	4,955	646
Test No. 2	30.0	.585	.435	6,380	8,600	1,420,000	4,970	784
Average				5,875	8,070	1,385,000	4,960	715

GRITING (BORNEO OAK).

	Per cent.	*Per cent.*	*Per cent.*					
Test No. 1	28.2	0.875	0.685	10,400	14,100	1,488,000	7,800	716
Test No. 2	26.6	.905	.720	8,800	10,450	1,485,000	7,425	897
Test No. 3	25.6	.898	.720	8,800	11,800	1,750,000	7,470	936
Test No. 4	22.5	.860	.700	9,130	11,100	1,620,000	7,675	1,075
Average			.706	9,280	11,860	1,586,000	7,590	906

DIVISION OF ACCOUNTS.

This division has charge of all disbursements for the bureau as well as the care of the public property for which the chief of the bureau is accountable. To equip and maintain the large Manila office and 59 forest stations and pay the traveling and incidental expenses of more than 100 forest inspectors and rangers, requires a force of 2 American and 2 Filipino clerks.

A card system is kept which will show at a glance the personal account of salary and traveling expenses of every employee in this bureau, with all needful information pertaining thereto.

A monthly report by the disbursing officer is rendered to the undersigned, which covers the expenses of the different divisions of the bureau.

Some inconvenience has been experienced since the enactment of Act 1040, which provides for the retaining of salary due for vacation leave until after the expiration of six months, and accrued leave two years. New employees are being continually sent out in the provinces who have not served six months, and salaries for periods of absence of these employees must be retained, as per the provisions of Act 1040. The salaries of these employees are forwarded on the last day of the month, but reports from employees thus stationed are not received until after the check has been sent, so that in cases of absence deductions must be made from the salary of the next month and the amounts so collected taken up by certificate. This could be avoided by the payment of salaries to employees on the 15th of the following month, thus giving them ample time to render their reports.

A letter from the executive bureau, under date of May 19, 1903, states that employees, through whose hands public funds pass in the offices of all cashiers and disbursing officers, should be bonded. In view of the above letter, it is recommended that one other employee in this division be bonded. While he, as a rule, will not have the han-

dling of official funds, it is occasionally necessary to intrust him with comparatively large sums of money.

In the past it has been the policy of this office to require employees who were incurring traveling expenses to send in their expense accounts without completed vouchers. Vouchers were then made out in this office and returned to them for signature and oath. This was done on account of lack of experience in making out such accounts, but it has entailed an enormous amount of work for the small force in this office, necessitating working overtime and delaying the payment of accounts, as well as adding to the volume of correspondence. This is gradually being changed, as a manual has been prepared which contains complete instructions covering all the different accounts for reimbursement of expenses incurred in an official capacity.

Expenditures for the bureau of forestry from July 1, 1903, to June 30, 1904.

Salaries and wages	₱227,371.18
Transportation	23,121.76
Contingent expenses	34,378.81
Maintenance of launch	8,894.42
Printing	11,097.20
Total	304,863.37

GEORGE P. AHERN,
Captain, Ninth U. S. Infantry, Chief Bureau of Forestry.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

Number and area of private woodlands registered in the bureau of forestry.

Province.	No. of estates.	Area.		
		Hectares.	*Ares.*	*Centares.*
Tarlac	26	47,024	73	39
Mindoro	2	24,185	00	00
Isabela	7	14,052	20	05
Pampanga	72	8,703	42	03
Rizal	1	4,651	20	12
Zamboanga	2	2,459	00	00
Davao	2	1,150	00	00
Camarines	1	923	60	72
Nueva Ecija	5	859	62	58
Romblon	2	649	92	50
Bulacan	2	644	96	73
Pangasinan	1	479	90	15
Bataan	2	364	76	37
Negros Occidental	2	368	32	46
Laguna	1	195	71	62
Capiz	2	97	99	26
Manila	1	54	56	00
Zambales	1	12	44	37
Total	132	106,877	38	35

The largest estate is that belonging to Marcelino Santos, located in the provinces of Tarlac and Nueva Ecija; area 13,202 hectares 44 ares. One hectare=2.47 acres.

AUGUST 1, 1904.

Quantities of forest products taken from the public lands of the Philippines during the fiscal year 1903–4.

Province.	Timber (maderas).	Firewood (leñas).	Charcoal (carbon).	Dyewood sapan (nigue).	Tanbark (cascalote).	Dammar gum copal (almaciga).	Gutta-percha (gutapercha).	India-rubber (goma elastica).
	Cu. ft.	*Cu. m.*	*Cu. m.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
Abra	53,087	930	4					
Albay	75,699	1,535						
Antique	8,344	2,353		2,211	6,050			
Bataan	317,133	18,225	58					
Batangas	10,786	5,233	9					
Benguet	48,114	66						
Bohol	92,536	1,886			4,539			
Bulacan	193,434	8,087	2,623			92,478		
Cagayan	163,031	1,514			23,167			
Camarines	269,060	7,178	12			43,496		
Capiz	44,760	6,693		6,500		3,288		
Cavite	8,425	5,206	10					
Cebu	60,012	1,203			15,813			
Cottabato	11,903	2,134					15,322	8,372
Davao	6,357			150		1,537,866		
Ilocos Norte	48,135	241						
Ilocos Sur	34,738	1,031						
Iloilo	120,210	32,785	1,060	10,310,085	137	140		
Isabela	45,263							
Jolo	1,909	71			5,500		471	221
Laguna	98,752	1,022						
Leyte	180,226	3,138			1,407			
Masbate	166,290	6,824		8,200	27,566			
Mindoro	201,181	5,172	113	33,060		1,533		
Misamis	67,101	29						
Negros Occidental	431,954	29,692			7,261	1,580		
Negros Oriental	39,595	930			5,528			
Nueva Ecija	70,354	2,990			1,600	16,213		
Pampanga	142,107	29,481	10		1,644			
Pangasinan	120,129	5,314	158	2,800	4,521			
Paragua	76,128	501		12,700	13,692	34,161		
Rizal	46,611	19,545	23			2,329		
Romblon	46,589	222				18,855		
Samar	87,324	1,298			42,344	13,478		
Sorsogon	95,831	1,443						
Surigao	33,600	391			84,378			
Tarlac	153,290	5,984				5,617		
Tayabas	600,494	13,925	4		113,923	15,057		
Union	35,825	872						
Zambales	409,683	4,134	2,665	43,880				
Zamboanga	200,562	1,139		200	37,299	4,995	35,063	
Total	4,916,562	230,417	6,749	10,419,786	396,369	1,791,086	50,856	8,593

Province.	Breas, resins (balsam and allied products).	Oils panao wood oil (lumbang).	Beeswax (cera).	Rattan (diliman bejuco).	Honey (miel).	Stakes for fish corrals (estacas).	Orchids (parasitas).	Zuecos (wood for shoes).
	Lbs.	*Liters.*	*Lbs.*	*Lbs.*	*Liters.*	*Cu. m.*	*Number.*	*Cu. m.*
Albay				520				
Antique				71,400				
Batangas			1,291					
Benguet							58	
Bohol		170				20		
Bulacan								263
Cagayan							9	
Camarines	2,200		611			3		
Capiz		234				475		
Cebu		516		2,530		21		
Cottabato			27,023				2	
Davao			64,698		18			
Ilocos Norte			129				5	
Ilocos Sur	150		150					
Iloilo	11,110			36,200		221	16	
Jolo	661		1,169			1		
Laguna				4,200			950	
Leyte		3,344		1,800		559		
Masbate	76,067					382	140	
Mindoro			3,498	158,961	864	2		88
Misamis			100					
Negros Occidental		79,585		87,030		180		
Negros Oriental		4,053		7,923				

Quantities of forest products taken from the public lands of the Philippines during the fiscal year 1903–4—Continued.

Province.	Breas, resins (balsam and allied products).	Oils panao wood oil (lumbang).	Beeswax (cera).	Rattan (diliman bejuco).	Honey (miel).	Stakes for fish corrals (estacas).	Orchids (parasitas).	Zuecos (wood for shoes).
	Lbs.	*Liters.*	*Lbs.*	*Lbs.*	*Liters.*	*Cu. m.*	*Number.*	*Cu. m.*
Nueva Ecija								65
Pampanga						314		
Pangasinan						26		
Paragua			2,643	2				
Rizal							1,000	
Romblon			336					
Samar	1,450		461	180				
Sorsogon		324						
Surigao		138	497				18	
Tarlac							49	
Tayabas	175,183		13,048				51	
Zambales						187	47	11
Zamboanga			33,404			114		
Total	266,821	88,364	149,058	370,746	882	2,505	2,345	427

Province.	Gratuitous.			Private estates.				
	Timber.	Firewood.	Tanbark.	Timber.	Firewood.	Charcoal.	Tanbark.	Stakes.
	Cu. ft.	*Cu. m.*	*Lbs.*	*Cu. ft.*	*Cu. m.*	*Cu. m.*	*Lbs.*	*Cu. m.*
Abra	6,451							
Bataan	3,253							
Batangas	236	269		3,712	591		150	
Benguet	149,791							
Bulacan	9,863			11,377		70		
Cagayan	5,716							
Camarines	15,450							
Cottabato	2,436							
Davao	401							
Ilocos Norte	41,353			2,642				
Ilocos Sur	4,164			506				
Iloilo	1,650	3,691						
Isabela				573				
Laguna	6,046			525				
Masbate	7,803							
Mindoro	1,259							
Misamis	3,347	26						
Negros Occidental	1,293			90,522	1,204			
Negros Oriental	2,143							
Nueva Ecija	12,237			4,382	3,429			
Pampanga	1,525			4,026	42,381	5,208		95
Pangasinan	11,968			2,793				
Paragua	4,435							
Rizal	4,034			10,256	4,720			
Romblon				9,922				
Samar	22,490							
Sorsogon	1,419							
Surigao	3,616		7,955					
Tarlac	4,472			217,825	672			
Tayabas	17,976							
Zambales	17,928	120,902						
Total	364,755	124,888	7,955	359,061	52,997	5,278	150	95

Imported into the Philippines during the fiscal year ending June 30, 1904.

Dutiable, timber	cubic feet..	192,354
Lumber	ft. B. M..	15,939,000
Government free entry, lumber	do....	11,890,000

Most important Philippine woods received in the market during the four preceding years, arranged in order of quantity.

No.	Tree species.	Relative order, fiscal year—				Total amount cut during the four years.
		1900–1901.	1901–2.	1902–3.	1903–4.	
						Feet.
1	Lauan	1	1	1	1	2,310,937
2	Apitong	4	2	2	2	1,421,770
3	Guijo	2	4	3	3	1,036,508
4	Molave	10	3	4	4	826,044
5	Yacal	15	7	5	5	558,448
6	Narra	13	5	6	6	438,182
7	Tanguile	20	6	7	8	363,351
8	Ipil	26	12	8	7	315,186
9	Dungon	5	9	11	9	262,885
10	Sacat	12	11	9	20	207,978
11	Malasantol	3	14	12	21	197,882
12	Macaasin	6	25	10	12	187,417
13	Calantas	11	15	16	10	185,288
14	Supa	7	8	15	33	177,189
15	Balacat	8	13	14	24	154,546
16	Tindalo	22	19	13	14	150,103
17	Bacao	30	10	37	11	143,147
18	Amuguis	17	32	17	15	130,129
19	Acle	34	24	20	16	122,563
20	Mangachapuy	24	20	24	17	121,999
21	Malabonga	19	18	26	19	117,370
22	Palo Maria	36	29	23	13	109,336
23	Balinhasay	21	23	21	30	104,594
24	Palosapis	25	17	28	22	99,163
25	Betis	33	21	22	26	97,276
26	Calumpit	23	34	19	28	94,098
27	Malaanonang	35	16	18	37	92,232
28	Panao	9	36	32	27	85,022
29	Bansalaguin	14	35	25	32	84,077
30	Banaba	37	33	27	18	84,044
31	Daluisi	18	27	29	35	79,605
32	Nato	27	22	31	31	77,682
33	Malabulac	16	26	35	36	74,800
34	Cupang	28	30	30	34	65,997
35	Aranga	31	31	36	25	63,746
36	Banuyo	29	37	33	23	60,425
37	Batitinan	32	28	34	29	59,832

Average Manila prices of timber per cubic foot and per thousand English board feet.

[Values are expressed in United States currency.]

Class.	In the log per cubic foot.	Sawed lumber per M. feet B. M.	Class.	In the log per cubic foot.	Sawed lumber per M. feet B. M.
Ipil	$0.50	$141.25	Amuguis	$0.21	$56.50
Molave	.48	162.50	Sacat	.25	55.00
Narra	.47	128.15	Aranga	.25	87.50
Tindalo	.50	143.75	Bansalaguin	.26	94.00
Yacal	.40	111.15	Malamhat	.16	62.50
Calantas	.31	156.50	Betis	.56	94.00
Dungon	.40	100.00	Banaba	.31	56.50
Acle	.37	85.00	Paitan	.31	56.50
Guijo	.31	80.00	Calumpit	.25	44.00
Palo-maria	.31	90.50	Cupang	.25	44.00
Apitong	.31	60.00	Magarilao	.25	125.00
Batitinan	.37	125.00	Nato	.25	62.50
Mangachapuy	.37	125.00	Malac malac	.16	47.00
Macasin	.20	122.00	Batiti	.18	109.00
Lauan	.20	48.50	Calamansanay	.37	156.50
Supa	.28	81.50	Toog	.18	62.50
Pasac	.31	81.50	Batino	.16	75.00

The prices quoted for native and American lumber in the Manila newspapers are as follows:

NATIVE LUMBER.

[Values expressed in United States currency.]

Species.	Value.	Species.	Value.
Molave.....M feet B. M..	$160.00	Supa.....M feet B. M..	$80.00
Narra red.....do....	150.00	Amuguis.....do....	83.00
Narra white.....do....	120.00	Nato.....do....	45.00
Yacal.....do....	125.00	Lauan.....do....	37.50
Ipil.....do....	125.00	Tanguili.....C. S. C. M..	[a] 50.00
Guijo.....do....	70.00	Apitong.....do....	[a] 45.00

[a] Per C. S. C. M.

AMERICAN LUMBER.

	Value.		Value.
OREGON PINE.		REDWOOD—continued.	
Rough, all sizes.....M feet B. M..	$40.00	Merchant No. 1—Continued.	$71.50
S 1 S and T and G, ½.....do....	41.50	Rough, clear.....M feet B. M..	
S 2 S.....do....	42.00	Merchant No. 2, $2.50 less per 1,000 feet B. M. on above prices.	
S 3 S.....do....	43.50		
S 4 S.....do....	44.00	HEMLOCK.	
T and G rustic.....do....	51.00		
REDWOOD.		Rough, all sizes.....M feet B. M..	40.00
		S 1 S.....do....	41.00
Merchant No. 1:		Cedar shingles, bundles of 250, per 1,000	6.50
Rough, all sizes....M feet B. M..	47.50	Lath, bundles of 100, omit	.65
S 1 S and T and G, ½.....do....	48.50	Molding, per inch linear foot	.01
S 2 S.....do....	49.50	Doors:	
S 3 S.....do....	50.50	6 feet 8 inches	4.25
S 4 S.....do....	51.50	6 feet 10 inches	4.50
T and G and rustic.....do....	60.00		

JUNCO (RUSH).

Province.	Local names.	Use.	Importance.	Cost of securing.	Local market price.	Average amount utilized during one month.
Abra	Bogbog	For walking sticks	Abundant	$0.02 per piece	$0.05 per piece	10 pieces.
Albay	No information		No information			No information.
Ambos Camarines	Mararogui, botong, cauayan, and daso.	No information	Scarce			Do.
Benguet	Led-da, rono, and loacan	For roofing purposes	Abundant	No information	$0.10 per 1,000	Do.
Bulacan	Palasan and bubuyan	For walking sticks	Not very abundant.	do	No information	Do.
Cagayan	None	No information	No information			Do.
Capiz	Unknown	do	do	No information	No information	Do.
Cebú			do	do	do	Do.
Ilocos Norte	None	No information	do	do	do	Do.
Ilocos Sur	No information	do	do	do	$0.12 per piece	Do.
Iloilo	do	do	do	do	$16 per 100	Do.
Laguna	do	do	do	do	No information	Do.
Moro (districts of Cottabato, Davao, and Zamboanga).	Taniguid, balala, nito, bamban, jagnaya, quili, and ayuma.	For walking canes, etc	Abundant	$2 per 1,000	$12 per 1,000	None.
Pangasinan	Palasan	No information	Scarce	No information	No information	No information.
Samar	do	For tieing purposes, and roofing	Very scarce	do	Not sold	None.
Tarlac	Culaoling and ayú	For tieing purposes	Abundant	$12 per 1,000	$1.50 per 100	2,000 pieces.
Tayabas	Balangut	For tieing purposes, etc	No information	No information	No information	No information.

CAÑA (CANE).

Abra	Caoayan, bayug, bolo, puser, and ingrio.	For building, roofing, and fencing purposes.	Abundant	$0.40 per day	$0.05 per piece	14,000 pieces.
Albay	Maruru gni, butong, orás	For building purposes and manufacture of chairs and beds.	do		$14 to $15 per 100	No information.
Ambos Camarines	Mararogui, botong, cauayan, and daso.	For houses, fish corrals, and fences.	Not very abundant.	$0.60 per day	$2 per 100	Do.
Benguet	Cawayan bolo, napnap, bayto, mangnao, and bical.	No information	Scarce	No information	No information	Do.
Bulacan	Bujo and bucaue	For fences, corrals, and manufacture of hats.	Abundant	$0.50 per 100	$2 per 100	3,000 canes.
Capiz	Botong, cauayan, bolo, and bagacay.	For building and fencing purposes, fish corrals, and manufacture of chairs and beds.	do	$1 per 100	$8 per 100	No information.
Cebú	Cauayan, lunas, butong, and bagacayó.	For fish corrals, fences, balsas, etc	do	$0.25 to $0.75 per day.	$8 to $20 per 100	Do.
Iloilo	Cauayan, gutong, and bolo	For building fences and balsas	do	$12 per 100	No information	Do.

Moro (districts of Cottabato, Davao, and Zamboanga).	Bentung, apus, tamlan, kiring, diana, bacayanan, nanap, rebuk, bantacan, bujo, patung, and lahi.	For fences, fish corrals, and manufacture of baskets and balsas.	do.....	$10 per 1,000.....	$50 per 1,000.....	None.
Negros Oriental...	Bulos, alanisnis, butong.....	For buildings, fish corrals, balsas, etc.	Not very abundant.	$3 per 100.....	$9 per 100.....	No information.
Pangasinan.....	Bolo and bical.....	No information.....	No information...	No information...	$2 per 100.....	5,000 pieces.
Samar.....	Cawayan.....	For fish corrals.....	Scarce.....	do.....	$25 per 100.....	None.
Tarlac.....	Buju and bical.....	For building and manufacture of saual.	Abundant.....	$11 per 1,000.....	$13.50 per 1,000....	No information.
Tayabas.....	Bulang-china, matinic, sina, taynanac, buju, anas, bolon, tuyumanac.	For buildings, fish corrals, and manufacture of baskets, etc.	No information...	$5 per 100.....	$6 per 100.....	Do.
Zambales.....	Bojo, caña, and baito.....	No information.....	do.....	No information ..	$10 per 100.....	Do.

BEJUCO (RATTAN).

Abra.....	Uay, batarag, barit, col-layot.....	For tieing purposes and for whips.	Abundant.....	$0.50 per laborer per day.	$0.10 per roll.....	2,500 rolls.
Albay.....	Tomarong, burubagacay, rimuran, lapnic, nucut, samulig, daanán and tanda, rora.	For building, and for tieing bales of hemp.	do.....		$5 to $6 per 1,000..	No information.
Amboe Camarines.	Tomarong, tararora, palanog, and gatasan.	For building, tieing hemp, fencing purposes, and manufacture of beds.	do.....	$1 per day.....	$4.50 per 1,000.....	Do.
Benguet.....	Digui, labney, talictic, col-layot, batarag, and barit.	For walking canes, manufacture of baskets, hammocks, and especially for building purposes.	do.....	$0.20 per day.....	$2 per 1,000.....	20,000 pieces.
Bulacan.....	Dahongway, picapec, way, bugtong, gatasan.	For tieing purposes, manufacture of ropes, hats, cigarette cases, etc.	do.....	$3.50 per 100 rolls.	$7 per 100 rolls....	5,000 rolls.
Cagayan.....	Apappit, alimuran, batarag, barit, pusi, uay, afugan, zitan, and barit.	For baling tobacco, building purposes, fish corrals, etc.	do.....	$0.25 per 100.....	$0.50 per 100.....	400,000 pieces.
Capiz.....	Oay and juag.....	For tieing purposes.....	Not very abundant.	$1 per 1,000.....	$2.50 per 1,000.....	No information.
Cebú.....	Bufigaong, minatay, pasan, pudlos, and balabá.	For baling hemp, roofing, walking canes, etc.	do.....	By the job.....	From $0 40 to $1.25 per roll of 100.	Do.
Ilocos Norte.....	Oay, parsic, batarag bogbog, barit, and nito.	For tieing and building purposes, manufacture of chairs, baskets, whips, walking canes, etc.	do.....	No information..	$0.05 to $0.10 per piece.	Do.
Ilocos Sur.....	Uay.....	For tieing purposes, and manufacture of chairs, beds, etc.	No information...	do.....	No information...	Do.
Iloilo.....	Tamalula, tambulagan, odiongan, tumalum, calapé, caditi, uay, jagnaya, and siguil.	For tieing purposes, manufacture of chairs, ropes, tieing of balsas, and for baling goods.	Abundant.....	$0.50 to $0.60 per 100.	$0.40 per 100.....	Do.
Laguna.....	Parlacanim and alimuran.....	For tieing purposes and manufacture of hammocks.	Scarce.....	$2.50 per 1,000.....	$3 per 1,000.....	5,000 pieces.
Masbate.....	Tumaron, uay-babae, calapi, palasan, magtaguictic, gatasan, lucuan and tandalora.	For tieing and baling all kinds of goods, especially hemp.	Abundant.....	$1.50 to $2 per 1,000	$2 to $3 per 1,000..	40,000 pieces.

BJUCO (RATTAN.)

Province.	Local names.	Use.	Importance.	Cost of securing.	Local market price.	Average amount utilized during one month.
Mindoro	Tumalim, talola, sumulid, gatasan, ditau, palasan, pidlis, and balinuay, or huag.	For manufacture of ropes, chairs, baskets, hammocks, etc.	Abundant	$0.10 per roll	$0.15 per roll	100 rolls.
Moro (districts of Cottabato, Davao, and Zamboanga).	Nafiga, kaninura, neket, rauan, palasan, icog-icog, sambaunutan, casisi nucot, tandau-ua or tandalola, capi, sega, purlus tamalula, tamuling, and balabah.	For tieing purposes, manufacture of ropes for carabaos, baskets, etc.	do	$2 per 1,000	$12 per 1,000	3,000 pieces.
Negros Occidental.	Uay, gatasan, labnauan, magnao, lontoc, budlos, bulufigan, bugtong, palasan, yaming-yaming, bagacayon, calapé, malpac, tambufigfiga.	For baling goods, roofing, fish corrals, walking canes, etc.		$2 to $8 per 1,000	$0.50 to $2 per 100	30,000 pieces.
Negros Oriental	Malabutong, hanamham, bulungannon, tagsaon, and oay.	For tieing purposes, and manufacture of rope, etc.	Abundant	$1.75 to $2 per 1,000	$3 per 1,000	200,000 pieces.
Pampanga	Palasan, bubuyan or mamucton, colaclin, palimanao, auay, and balinguay.	For tieing purposes, etc	Not very abundant.	No information	$0.18 per 100	
Pangasinan	Babuyan na Peteg, babuyan na bogtong, nocy, bughog, barit, salungsungan, culacling, and batarag.	For tieing purposes, walking sticks, whips, baskets, chairs, etc.	Abundant	$1.25 per 100	$1.75 per 100	100,000 pieces.
Paragua	Sica, sic-sic, buctun, palasan	do	No information	$2.50 per pico	$3.60 per pico	35 picos.
Samar	Uway, tagsaon, malabagaca, talolora palanog.	For tieing purposes, and manufacture of fish corrals.	Scarce	$2 per 100	Not sold	
Surigao	Tumayom, tagsajon, palasan, palanog, bagangan, uayban, qui-os, taniguid, and pudlus.	For baling tobacco and other goods, walking canes and manufacture of chairs and beds.	Abundant	$2.50 to $3 per 1,000	$4 per 1,000	50,000 pieces.
Tarlac	Yantuc, ane, babuyan	For tieing purposes, and manufacture of baskets and tampipes.	Not very abundant.	$15 per 1,000	$12 per 1,000	10,000 pieces.
Tayabas	Tumalin, talula, palasan, locoan, apas, panlis, palac lacanin, tandula, sipal, bogotonguin, lambutan, samuling, dichan, sambolagai, simuran, taguictic, lucuan, palasan, daanán, and nito.	For tieing purposes, twine, etc	Abundant	$1.50 per 100	No information	No information.
Zambales	Panlaut, abet, palasan, bulalit, hamoi, yantoo, boloyan, manogton, babuoi, simoran, apis, dittan, bucton, yantuc-na-pula, yantoc-naputi, abañgan, and baliuyan.	For tieing purposes and manufacture of rope; is also used in construction of rafts.	do	No information	$15 per 1,000	5,000 pieces

NOTE.—All prices mentioned are in Philippine currency. A pico is equal to 137 pounds. A roll is equal to about 100 pounds.

APPENDIX I.

FIFTH ANNUAL REPORT OF THE MINING BUREAU.

DEPARTMENT OF THE INTERIOR,
THE MINING BUREAU,
Manila, September 15, 1904.

SIR: I have the honor to submit herewith the annual report of the mining bureau, being for the year ending August 31, 1904.

THE BUREAU REORGANIZED—PERSONNEL, PURPOSES, AND PLANS.

After having completed the work for which it was originally organized under the military occupation, as fully discussed in the last annual report of this bureau, the bureau was reorganized by the passage of Act 916 of the Philippine Commission, which act went into effect October 15, 1903.

Previous to the reorganization the first chief of the bureau, the Hon. Chas. H. Burritt, was appointed judge of the court of first instance, to preside over the mountain district, and the undersigned, mining engineer, was appointed chief of the bureau to date from October 15. The present chief took the oath of office on November 2, immediately upon his return from accrued leave in the United States, and proceeded at once to the reorganization authorized.

The functions of the mining bureau are prescribed in section 4, Act 916, which reads as follows:

> It shall be the function of said bureau to make, facilitate, and encourage special studies of the mineral resources, mineral industries, and geology of the Philippine Islands; to collect statistics concerning the occurrence of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make collections of typical geological and mineralogical specimens, especially those of economic and commercial importance, such collections to constitute the museum of the mining bureau, subject, however, to transfer, by executive order of the civil governor, to any general museum established; to provide a library of books, reports, drawings, etc., bearing upon the mineral industries, the sciences of mineralogy and geology, and the arts of mining and metallurgy, such library constituting the library of the mining bureau; to make a collection of models, drawings, and descriptions of mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections and library as to make them available for reference and examination and open to public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of the Philippine Islands; to make an annual report to the secretary of the interior, setting forth the important results of the work of the bureau, such special reports as may be called for by proper authority, and such bulletins concerning the statistics and technology of the mining industries and of the geological and mineralogical and other office and field work of the bureau as may be approved by the chief of the bureau and ordered published by the secretary of the interior.

In order that the work outlined above may be properly carried out there are provided, by the act above noted, a permanent staff composed of a chief of the bureau, two geologists, and two field assistants; a temporary service of "such assistance from mining engineers, experts, and practical miners, or others, as the funds appropriated for the field work of the bureau shall warrant," and the clerical force required. The chief of the bureau and the geologists "shall be graduates of recognized schools of mines, or shall have received degrees in mining, metallurgy, or geology from reputable universities, or shall have successfully completed work in such schools of mines or universities equivalent in kind and amount to that for which such degrees are given," and the field assistants shall be selected by standards equally high. The work of the bureau being broad in its scope and the staff few in number, it is essential that the personnel be equipped as above outlined. At the present time four of the five positions are filled by school-of-mines men with practical experience in mines and smelters, added to technical training in the best professional schools, and the remaining position of geologist it is hoped will in the near future be similarly filled.

The mining bureau, as at present constituted and reorganized by Act 916, is essentially a bureau to further the interests and development of the mineral resources of the Philippines in every practicable way; to advise the civil government concerning mining, metallurgy, the allied industries, and geology in its various practical applications, and to cooperate with other government bureaus to the fullest extent possible in the encouragement and development of the great latent natural wealth of the Philippine Islands. Incidentally, scientific work will be done by the various members of the bureau staff in geological, petrographic, and paleontological research, but this will always be subordinate to the work in the various subdivisions of economic geology for which the bureau has been reorganized, and will be contingent upon the time and facilities that can be utilized without injury to the work of more practical benefit and immediate need.

The functions of the bureau represent, therefore, those of a State mining bureau in the United States rather more than those of the Federal Geological Survey, and it will be the chief aim of the bureau to assist in the establishment and maintenance of a mineral industry in these islands, to the end that the mineral wealth may be brought into active yield.

In anticipation of the present organization the mining bureau has done work of the nature above outlined during the past three years, although, as originally established under the American occupation by the order of the military governor, Gen. E. S. Otis, to First Lieut. Chas. H. Burritt, the most important work of the bureau under the late able chief and lawyer was the review and report upon the status of Spanish mining claims, and the study, translation, and interpretation of the Spanish mining law involved therein. The importance and magnitude of this work has never been overestimated, and it was a source of well-deserved satisfaction to Mr. Burritt, upon his elevation to the bench, to hand down to his successor as chief of the mining bureau a completed work with respect to the Spanish law and claims. In addition to the above important service rendered, (1) of translating, editing, abstracting, and publishing the Spanish mining law

complete, and (2) of reviewing and reporting upon mining claims pending against the United States by virtue of the treaty of Paris, the bureau, under Mr. Burritt, indexed and classified all records received from the Spanish Inspección de Minas; studied the mining situation with reference to recommending legislation for the building up of an industry; advised the general public and the government concerning mining rights; translated a large amount of material from the Spanish; published the Coal Measures of the Philippines and Bulletins Nos. 1, 2, and 3; submitted 10 volumes of special reports to the military and civil governors and the secretary of the interior; initiated field work; and upon the completion of the work for which the bureau was originally reestablished, and upon the increasing demand for a reorganized bureau with present scope and purpose, advocated the passage of Act 915, "An act transferring the administration of mining grants and claims instituted prior to April eleventh, eighteen hundred and ninety-nine, from the mining bureau to the bureau of public lands," and Act 916, "An act reorganizing the mining bureau and prescribing the functions thereof," the substance of which latter act is given above.

During the first four months of its establishment the bureau consisted of its chief and the clerical force and no provision existed for a technical or scientific branch. During July, 1900, however, authority was obtained from the military governor for the appointment of a mining engineer, and on August 1 the present chief of the bureau was selected for that position. This branch of the bureau, technical and scientific, took charge of the departments of mineralogy, lithology, geology, assaying, field work, translation of technical papers, the extensive collections of the bureau, the preparation of maps and plans for publications, the obtaining of information concerning the mineral resources, and the preparation in general for the future needs of the mineral industries, and it was this branch that by evolution and development became the reorganized bureau of to-day. Reports were made by the mining engineer to the chief of the bureau upon various questions arising during the work. A large number of minerals, earths, coals, ores, and rocks were examined and reported upon for miners, prospectors, and others; Bulletin No. 1, "Platinum and the Associated Rare Metals in Placer Formations," was prepared and published, as was also Bulletin No. 3, "Report on a Geological Reconnoissance of the Iron Region of Angat, Bulacan;" preliminary field work was done in Bulacan, Batangas, Culion, Busuanga, Cuyo, Paragua, and Balabac; a collection of ores, minerals, and rocks was prepared for the St. Louis Exposition; and collections of minerals, ores, rocks, catalogues, books, and other reference material were begun, for use not only in bureau work, but for the benefit also of miners, prospectors, and others to whom such material would not otherwise be available and whose needs the bureau should constantly strive to serve.

It is planned under the present reorganization to prosecute field work as rapidly as possible, in order that the mineral resources of the islands may be reported upon without further delay; to take up statistical work, in order that the records may be kept abreast of the infant but growing mineral industry; to prepare and publish reports and bulletins upon the subjects above as rapidly as opportunities permit; to increase the reference material of the bureau, and to provide

for the giving of information to visitors and correspondents in every practicable way; to do petrographic and paleontological work, and in general to encourage and assist in the upbuilding of a profitable mineral industry, with every service of the bureau free to all.

ASSAY WORK TRANSFERRED.

At the time of the original appointment of the mining engineer to this bureau the bureau of government laboratories had not yet been established and there were few and very imperfect facilities in Manila for assay work. It was felt that some provision should be made for fire-assaying and other ore valuation, and a limited supply of assay material was ordered from the United States. In the meantime, such apparatus and material as were available for use from the property of the old inspección de minas were utilized so far as possible, as mentioned in previous reports, and some work of value was accomplished for the bureau and for miners and prospectors in need of such aid. No fees whatever were authorized or charged. The limitations of available force, time, and material necessarily kept this work within the preliminary stage, and no attempt was made to build up custom trade. Shortly after the arrival of fresh assay supplies the bureau of government laboratories was organized, charged with all government assay work, and authorized to collect fees for the custom trade. The other duties of the mining engineer precluding his giving more than a small portion of his time to assay work, and the law providing for the centralization of the government laboratories for purposes of economical administration, the mining engineer, in his annual report for 1903, recommended that all assay supplies and apparatus, with the exception of blowpipe and other material required in the work of this bureau, be transferred to the bureau of government laboratories and thereafter all such work be performed therein. This transfer was authorized by resolution of the Philippine Commission, and on October 14, 1903, all such material was so transferred. Blowpipe and petrographic microscopical mineral and rock determinations will be done within the mining bureau by members of the bureau staff especially selected and trained for the work, as such work pertains to this bureau alone. All other laboratory work will be performed by the bureau of government laboratories.

With the complete equipment of the new laboratory building, probably the most thoroughly modern and extensive laboratory in the Orient, and with the reduced scale of assay charges recommended by this bureau and favorably acted upon by the superintendent of government laboratories and the honorable the secretary of the interior, every need of miners, prospectors, millmen and smeltermen should be satisfactorily supplied, and there should be no further reason for sending samples for assay to the United States.

ADMINISTRATION OF MINING GRANTS TRANSFERRED.

In his annual report for the year 1903, Mr. Charles H. Burritt, chief of the bureau, recommended—

* * * that all remaining matters relating to titles be transferred to the bureau of public lands, where the titles to mineral lands, under the new law, are now located by virtue of the act of Congress, thus leaving this bureau for the geological and mineralogical studies just indicated and the systematic work of encouragement and promotion of the mining industry

along the lines followed by the several State mining bureaus in the United States, but a work which is not accomplished or attempted by the Geological Survey of the United States.

The transfer of this purely land-office business was authorized and directed by Act 915 of the Philippine Commission, entitled "An act transferring the administration of mining grants and claims instituted prior to April eleventh, eighteen hundred and ninety-nine, from the mining bureau to the bureau of public lands," providing:

SECTION 1. The records and archives of all existing mining claims of whatever class or description now in the custody and under the charge and official control of the mining bureau and pertaining to the so-called Spanish mining grants and mining claims of every kind instituted prior to April eleventh, eighteen hundred and ninety-nine, shall be, as quickly as practicable, inventoried and turned over to the bureau of public lands, and receipted for by the chief of that bureau.

SEC. 2. The administration of such mining grants and mining claims of every kind instituted prior to April eleventh, eighteen hundred and ninety-nine, and heretofore vested in and exercised by the mining bureau, is hereby transferred to and shall hereafter be vested in and exercised by the bureau of public lands.

The above transfer was effected on October 23, 1903, and all land-office business pertaining to mining claims is now where it properly belongs—within the jurisdiction of the bureau of public lands.

In this connection mention should be made of the Philippine Mining Code, compiled by Mr. D. W. Yancey, attorney of the bureau of public lands, containing a "Pospector's Manual and Codification of the Mining Laws of the Philippine Islands, with Forms; with which is published an appendix containing the acts of the Philippine Commission and extracts from the act of Congress of July 1, 1902, relating to mining." This little manual contains in concise form the information desired with reference to the law governing Philippine mining claims subsequent to the Philippine act. It is published by the American Book and News Company, Manila, and it will be revised and brought up to date from time to time as subsequent legislation, rulings, and decisions may suggest.

This manual, with Burritt's Abstract of the Mining Laws (Spanish mining codes), constitute the reference material of this nature desired.

QUARTERS OF THE MINING BUREAU.

The mining bureau is at present quartered in the four front rooms of the second floor of the old Casa Moneda, at 358 Calle Cabildo, Intramuros. There is one side room adjoining these on Calle Recoletos, used as the office of the chief of the bureau, and there are several small rooms fronting on the courtyard utilized for storage purposes. The needs of the bureau are such that the present accommodations are entirely inadequate. The offices in the Casa Moneda are cool and well ventilated, and the roofs and gutters having been recently repaired by the bureau of architecture, at the request of the chief of this bureau, the rooms are reasonably dry during the heaviest rains. The light is insufficient for the collections and for some of the desks, however, and the offices are crowded by the present force, and will be still more cramped when the staff is complete.

It is not considered desirable to move the bureau offices and property again until permanent quarters may be assigned. It is here recommended, however, as it was recommended in the annual report of the mining engineer for 1903, that "provision be made for a suitable wing of the new building of the government laboratories, to be set

aside and properly furnished and equipped" for the use of the mining bureau.

Plans have been submitted by this bureau for the arrangement of rooms of the second floor of said wing, and it is believed that the accommodations suggested will satisfy the urgent need of more light and room, and will provide for a modern and permanent home, at present so greatly desired.

OFFICE WORK—EXECUTIVE, CORRESPONDENCE, EXCHANGES, LIBRARY OF CATALOGUES.

Notwithstanding the transfer of business pertaining to titles and mining grants and claims to the bureau of public lands, the office work of this bureau has steadily increased.

Reports, opinions, and advices have been given upon mining matters and the mineral industries, and upon samples of ores, minerals, rocks, metals, and alloys sent to this bureau for examination, these reports being either based upon analyses or determinations made by the bureau of government laboratories by request of this bureau, or, more often, upon blowpipe or other examination made within the bureau by members of the bureau staff. It has not been the policy of this bureau to request work by the laboratories that should properly be classed as custom work for which fees are charged, and all such work has been referred to the laboratories direct. The geological, mineralogical, and metallurgical investigation and reports outlined above fall logically within the province of this bureau, whose staff are especially trained and selected for the work, and whose duties include the above, as outlined in act 916.

Correspondence with reference to the application of the mining laws to public lands has necessarily continued through the failure of many to understand that the jurisdiction of all such matters has been, since the passage of act 916, within the province of the bureau of public lands. All such correspondence has been referred by indorsement to the chief of the bureau of public lands, and the writers interested have been so informed.

There has been a constant demand for information concerning the mining laws in force, and requests have frequently been received for copies of the laws. To prevent the necessary loss of time involved in indorsement, reference, and correspondence, the chief of this bureau has obtained copies of the Philippine act and of the acts of the Philippine Commission Nos. 624, 777, 859, 1128, and 1134, constituting the complete mining legislation at present in force in these islands, from the executive secretary, and has inclosed these copies within Manila covers with blueprint title, bearing upon the inner front cover notes to the effect that the mining code previously mentioned has been compiled by D. W. Yancey, and that—

The inclosed acts of Congress and of the Philippine Commission, constituting the mining law of the Philippines complete up to May 20, 1904, are here gathered together merely for the convenience of correspondents of the mining bureau. It should be borne in mind that all questions of mining lands and mining law fall within the jurisdiction of the bureau of public lands, to which bureau letters upon matters not covered in the mining code should be addressed.

These copies have been sent to correspondents of this bureau direct, upon request, and with blank receipt form inclosed.

Correspondence has increased in connection with mines and mineral resources, exchanges, the distribution of bureau publications, the forming of a complete library of catalogues, executive and other work of the chief of the bureau, and replies to requests for information from America, Europe, and the Orient. The entire correspondence of the bureau is now filed and indexed by the card system, and the economy thus obtained has been very marked. The labor and credit of transferring the correspondence of the bureau for the past four years to files and indexing the letters under three headings each are due to Mr. Robert Clift Redmayne, chief clerk and stenographer. A great deal of overtime has been cheerfully and voluntarily performed by Mr. Redmayne in connection with this and other work, and the skill, good judgment, and zeal shown by him in this matter is but characteristic of him and his loyalty to his work. In this and in other office work Mr. Redmayne has had the faithful assistance of Mr. G. M. de Ubago, record clerk, who has occupied his present position in this bureau for over four years and whose services have been most valued throughout. The work of indexing the Spanish records, referred to in most complimentary terms by the late chief of this bureau and by the honorable the secretary of the interior in the report for 1903, was done by Mr. Ubago, and his ability shown therein deserves high praise.

During the year an important exchange system has been originated and developed, and there are now on file in the reading room of the bureau most valuable series of periodicals from America, Europe, and the Orient. These include engineering, mining, metallurgical, and geological publications, bulletins and reports of state and national mining bureaus and geological surveys, and papers devoted to subjects dealing with mining, metallurgy, and the allied arts. This valuable literature has largely been obtained through exchange with publications of the bureau, but in a few cases paid subscriptions have been required.

The small working library of the bureau has been but slightly increased during the year. There are a number of important and necessary references upon mining, metallurgy, geology, and the mineral industries pertaining to the work of this bureau alone, and therefore of the greatest practicable benefit upon the shelves of the working library, which should be added without further delay. Authority has been obtained for the purchase of a complete set of the Transactions of the American Institute of Mining Engineers, a most invaluable series of papers covering the investigation of American mining engineers, metallurgists, and geologists for the past thirty-three years. A library of catalogues from several hundred firms in America and Europe manufacturing or dealing in mining, milling, and general supplies is being collected for the use of those who turn to this bureau as a source of information upon subjects connected with the development of mines. This library is being carefully gathered and indexed, and should prove of great value to all requiring its use.

A double desk for the use of the public is maintained in the reading room, and furnished with necessary stationery for the taking of notes from books, periodicals, or catalogues. This desk is not used for any other purpose and is open to the benefit of the public at all times during office hours. The facilities of the bureau for furnishing reference material for use at this desk, and for supplying informa-

aside and properly furnished and equipped" for the use of the mining bureau.

Plans have been submitted by this bureau for the arrangement of rooms of the second floor of said wing, and it is believed that the accommodations suggested will satisfy the urgent need of more light and room, and will provide for a modern and permanent home, at present so greatly desired.

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tion within the scope of the bureau work, are constantly becoming more appreciated, and visitors are always cordially welcomed and assisted in every possible way.

MUSEUM WORK.—ADDITIONS, EDUCATIONAL COLLECTIONS, CATALOGUING, PETROGRAPHIC AND PALEONTOLOGIC WORK.

Valuable additions to the mineral museum and working collections have been made during the past year.

During the recent presence in the United States of the undersigned upon accrued leave he was authorized to purchase specimens for the working collections of the bureau not to exceed in cost $650 United States currency. The sources of supply in New York, Philadelphia and Washington were visited, and contracts were finally made with George L. English to furnish one general collection of 350 pieces, representing the more important minerals, especially those entering into the composition of rocks, and one representative collection of 200 pieces exhibiting the ores and minerals of economic interest. A contract was also made with Edwin E. Howell, of Washington, to furnish a working collection of 225 specimens of rocks, and another collection for comparative purposes of 250 specimens of fossils, particularly those of the Tertiary and Quartenary, for use in stratigraphic and paleontologic work. These collections were satisfactorily packed and turned over to the New York office of the insular purchasing agent for shipment to Manila. They have since been received in excellent condition and installed in cases in the bureau. These collections, while handsome and making a most attractive display, have been purchased as working collections and are as necessary as books in the comparative and determinative work of the bureau. They are also of great value to visitors, particularly to miners and prospectors, and in educational use alone are worth their cost.

The field work of the bureau has also resulted in additions to the collections, particularly of ores and rocks. The field party under Mr. A. J. Eveland, geologist, working in Lepanto, brought back a suite of nearly 100 specimens of copper and gold ores and smelter products, gangue minerals, country rock, and models of primitive Igorrote metallurgical apparatus and tools. The exploratory march across the island of Mindoro by an expedition of the Twelfth Cavalry, in which the chief of this bureau took part, resulted in a suite of 20 specimens collected at intervals across the island, showing slates, white marbles, and precious serpentines never before known in Mindoro. A brief trip made by the chief of the bureau to the Taal Volcano also resulted in a small collection of volcanic rocks, later to be worked up. In addition to the above a large number of samples of ores, coals, clays, rocks, guanos, and a few fossils have been contributed by miners, prospectors, and other friends of the bureau, to whom the obligation of this acknowledgment of appreciation is due. Among these should be especially mentioned a collection of 28 samples of gold, iron, and manganese ores of the mineral region of Arroroy, Masbate, kindly given by Mr. Heise, whose interests are extensive in the region named.

In order better to facilitate the exhibit of the mineral resources of the Philippines the museum has recently been entirely rearranged,

and the economic collections are now given the most conspicuous display. One case is devoted entirely to coals, another to gold ores, a third to copper, lead, and iron ores, and a fourth to pottery and brick clays, cement and limestone, and building stones, all from the Philippines. In addition to these a handsome hexagonal cabinet at the head of the stairway contains the economic collection purchased in the United States, and another case contains copper tools, showing the methods of Igorrote copper metallurgy in Lepanto, and iron castings, molds, and apparatus illustrating the Tagalog iron smelting in Bulacan.

Two large cases are filled with the general collection of minerals recently acquired.

One large case contains the fossil and the rock collections purchased in the United States, and in a number of other cases will be arranged, by provinces, for geological work, the various mineral and rock specimens, not previously included, from the different areas of the Philippines.

The greater part of the museum has been recatalogued since the establishment of the bureau; but it is now the plan of the chief of the bureau to systematically recatalogue the collections entire by the card system, to the end that the greatest possible efficiency of their service may be obtained.

Great credit is due Mr. H. M. Ickis, field assistant, for his rearrangement of the collections and for his enthusiasm and intelligence in the museum work of which he has been placed in charge.

The ordinary macroscopic and blowpipe determination of minerals and rocks has been carried on in the bureau for the past four years. These determinations are in most cases readily made, and require the skill and training of the mineralogist and petrographic geologist rather than those of the chemist. They are, therefore, as they have been, proper subdivisions of the work of this bureau. The microscopical determination of minerals and rocks, requiring the work of a petrographer and geologist, will also be done in this bureau, as will the paleontologic work in the study of fossils for stratigraphic and correlation work in connection with the investigations of the coal, iron, limestone, and clay series of the Philippines. The work of the bureau is so planned that these subdivisions of purely mineralogical and geological work will be allotted to members of the bureau staff especially assigned to the investigations, and all, with the exception of one geologist, now appointed and at work. The investigations, both in office and field, are following as fast as appropriations and resources permit along systematic lines planned by the present chief of the bureau years in advance of the work.

FIELD WORK.

Although the provisions of act 916 reorganizing the mining bureau were effective on October 15, 1903, and the present chief of the bureau began the reorganization authorized on November 2, the first field assistant, Mr. H. M. Ickis, was not secured until November 17, 1903, and the first geologist, Mr. A. J. Eveland, did not arrive from the the United States until January 16, 1904. Field work for the fair season in Lepanto and Benguet had been planned in advance, but no funds were available for the first half of the fiscal year and the

party could not be equipped and started north until after the passage of Appropriation Act 1049, on February 11, 1904. Upon the funds appropriated therein becoming available the party was promptly organized, equipped, and placed in the field with complete instructions for their guidance in the prosecution of their work.

This party consisting of Mr. A. J. Eveland, geologist in charge, Mr. H. M. Ickis, field assistant, and Mr. Levi Riendeau, and Mr. Robert Grant, temporary employees, left Manila on the Coast Guard steamer *Masbate* on February 23, and disembarked at Candon on February 26. After various delays, chiefly from difficulty in securing transportation, the party reached the copper district of Mancayan on March 10, and systematic work in compliance with instructions was begun. From Mancayan the party moved to Suyoc for the completion of the work in that part of the field, and on June 22, the rains having brought further work to an end, and the reconnaissance being in the opinion of Mr. Eveland fairly complete, the return to Manila was begun. Mr. Goodman, field assistant, who joined the party March 13 in Lepanto, was instructed by telegram to relieve Mr. Eveland and bring the party to Manila, making a route survey from Cervantes to the coast. Mr. Eveland was relieved of charge by the same telegram and instructed to return to Manila through Benguet, in order that conditions might be observed there with reference to future work. Mr. Goodman, with the assistance of Mr. Ickis and Mr. Riendeau, was singularly successful in the completion of a difficult route survey, and to him and his associates great credit is due. Later, when awaiting transportation at San Fernando, Mr. Goodman was "authorized" by telegram to make a route survey from the coast to Baguio, thus giving surveys of two important transportation routes from the coast to the respective capitals of the northern mineral provinces. Although only "authorized," because the chief of the bureau could not be satisfied that sufficient time was available before the arrival of the next transportation to bring the party south, Mr. Goodman showed his commendable spirit by beginning the survey immediately and completing it within four days at Baguio, where he reported by telegram. He was there taken with a high fever and went to the sanitarium. Mr. Ickis, in answer to a telegram for instructions, was directed to bring the party to Manila, which he successfully did after various vicissitudes due to lack of transportation. Mr. Eveland returned over the Benguet road to Dagupan and from there to Manila by Coast Guard steamer *Basilan*, Mr. Goodman following him a few days later by the same route.

The party was absent from Manila over five months, although two months of this time were devoted to the delays necessary for transportation to and from the areas surveyed. A narrative report from Mr. A. J. Eveland, geologist, in charge of the party up to the completion of the work at Mancayan, has been prepared by direction of the chief of the bureau and is herewith respectfully submitted as Exhibit B. This report, and the successful completion of the work involved in the reconnaissance executed by Mr. Eveland, speak for themselves, and are a credit to Mr. Eveland in his first work in difficult Philippine fields.

A more complete report, giving the important results of Mr. Eveland's investigations in the field, with maps from the surveys of

Messrs. Goodman and Ickis, megascopic and microscopic determinations from this bureau, and assays and analyses from the bureau of government laboratories, is now in course of preparation and it is hoped will soon be published as a bulletin from this bureau.

A map is herewith respectfully submitted showing the area covered by topographic survey and geological reconnaissance in Lepanto Province, the route surveys made, and the routes of travel followed by the party as a whole or as later divided in going to and from the area surveyed.

In addition to the field work outlined above an examination was made by Messrs. Eveland and Ickis, by direction of the chief of the bureau, of certain gold-placer deposits at the junction of the San Mateo-Novaliches road and the Novaliches River, in connection with the identification of placer platinum, evidences of which metal were suspected by this bureau from examinations of gravel brought in to the office. As a result of this work, and the final confirmation from the bureau of government laboratories from samples submitted by this bureau for analysis, the chief of the bureau is now justified in announcing the definite discovery of platinum in the Philippines. The amounts found are not yet of commercial importance, but it is hoped that more favorable reports may be made by this bureau as a result of more extended work.

In Rizal Province also, the chief of the bureau found time to examine some reported coal deposits in the mountains east of San Mateo. The seams observed were found not to be of sufficient thickness for profitable exploitation, and by analysis the coal was found to be 35 per cent ash. Although these seams are unimportant, it has been known for some years that a good lignite occurs in apparently large amount nearer the towns of Bosoboso and Antipolo, Rizal.

During the month of April of the present year the chief of this bureau, by invitation of Maj. W. W. Gibson and Capt. R. E. L. Michie, U. S. Army, of the General Staff Corps, and of the Military Information Division, Headquarters of the Philippine Division, and through the courtesy of the officers of the party, was a member of an exploring expedition fitted out from the Twelfth Cavalry at Camp McGrath, Batangas, for the purposes of crossing Mindoro from Baco, on the east coast, to Santa Cruz, on the west coast, and of seeking such information as was to be obtained concerning the people, resources, and conditions of the interior of this portion of Mindoro, hitherto not known to have been explored.

The expedition, consisting of First Lieut. Fitzhugh Lee, jr., Twelfth Cavalry, in command; First Lieut. John W. Hanner, Medical Department, medical officer; Second Lieuts. Robt. McC. Beck, jr., and Chas. R. Mayo, Twelfth Cavalry, intelligence officers; and the chief of this bureau, with 14 picked troopers from the Twelfth Cavalry, 2 hospital corps men, and 32 cargadores, was organized, equipped, and supplied at Camp McGrath, Batangas, by direction of Lieut. Col. Geo. F. Chase, Twelfth Cavalry, commanding the regiment and post, and left Batangas on April 2 on the army quartermaster's department launch *Atlanta*, arriving and disembarking at Baco, Mindoro, on the same afternoon. The Baco River was ascended in bancas for about 12 miles, and at the point of debarkation the march began. The right bank of the river was followed until the north arm, called the Alog, was reached, and this in turn was followed until a series of

gorges and precipices accompanied by waterfalls made farther progress impossible. The north arm of the Alog was then followed to its headwaters, beyond which the mountain divide, here a north spur of Mount Halcon, was crossed at an altitude of 3,200 feet. The headwaters of the Bagbajan River appearing on the west slope, the expedition followed this river from source to mouth at the barrio of Bagbajan, on the west coast. A half day's march down the coast brought the party to the barrio of Santa Cruz, on April 19, where the launch *Atlanta* arrived a few days later with additional supplies. The return to Batangas was made around the north coast of Mindoro by this launch.

The party crossed Mindoro on foot, in light marching order, and carrying all supplies upon the backs of native cargadores. They slept at night on the ground under 8-ounce shelter halves, and subsisted upon the excellent military rations of hard bread, bacon, canned stew, and coffee, the natives being furnished canned salmon and rice. The trip proved to be one of exceptional difficulty, as judged by the previous field experiences of the members of the expedition. There were no roads, and only in few portions of the route were there signs of Mangyan trails. There were no sources of supply, the only inhabitants of the country being the wild Mangyans. The rain fell in torrents during the seven or eight days in the forests of the divide, and during the darkness of the night of April 12 the party barely escaped losing their supplies, if not their lives, from a mountain flood which swept down the narrow valley, carrying everything before it.

The interior of Mindoro traversed by this expedition was found to contain no settled or civilized inhabitants, the only natives met being the wild Mangyans. The forest contains many fine woods—the brea blanca and what appeared to be gutta-percha and nutmeg, and, on the higher western slopes, true pine trees—and the rock exposures showed great thicknesses of crystalline limestone, much of it a fine white marble, and of slates. Precious serpentine was found as float, as was bornite, a valuable copper ore. The streams were panned for placer gold, platinum, and tin, but none were found. The rocks in general are metamorphic and apparently of considerable age. The volcanic rocks were found only on the west coast. The upper valley of the Bagbajan is a beautiful open country, suggestive of farming and grazing possibilities. The soil seemed rich wherever examined. Wild game, both large and small, occurs in abundance, but the size of the party, and the rapid marches necessary to traverse the island before the supplies were exhausted, prevented much satisfactory hunting, as this rapid progress precluded also detailed examinations of exposures where found.

Route surveys were made from coast to coast by Lieutenants Beck and Mayo, and the chief of this bureau is only awaiting copies of the maps resulting from these to complete his report upon this trip.

The success of this expedition, traversing a portion of Mindoro which it is understood previous expeditions had failed to cover, was due, in the opinion of the chief of the bureau, to the able leadership of the officer in command, Lieut. Fitzhugh Lee, jr., supported by the loyal assistance of Lieutenants Hanner, Beck, and Mayo, the good spirit and splendid service under most difficult conditions of the enlisted men of the command, and the uncomplaining, dogged perseverance of the native cargadores employed.

Advantage was taken by the chief of this bureau of the half holiday of July 2 and of the holidays of July 3 and 4 to make a preliminary visit to the Taal Volcano, in Batangas Province, then in unusual activity, for the purpose of collecting material for study and of outlining plans for some future work. It is hoped, as opportunities and time from more pressing work permit, to edit, bring up to date, and publish as bulletins of this bureau reports and papers written by former Spanish geologists of the Inspección de Minas upon volcanoes of the Philippines, translations of which have already been made by the undersigned. A careful study of volcanic phenomena should throw much light upon geologic conditions of the past.

The future fieldwork of the mining bureau has been planned by the chief of the bureau for several years in advance, and this work will be carried on as fast as opportunities, the field force, and funds appropriated permit.

With appropriations at present available it is planned in the immediate future (1) to investigate the mineral resources of Benguet, and Mr. A. J. Eveland, geologist, will probably be detailed for the work; (2) to examine the coal deposits of Batan and the gold gravel deposits of Masbate, and the chief of the bureau will attempt sufficient time in connection with his other work for this and other field trips of comparatively short duration of time from the office; (3) to continue the collection of statistics and general information concerning the mineral resources and industry, to which work Mr. Maurice Goodman, field assistant, has been provisionally assigned; (4) to continue the gathering of information concerning brick and pottery clays, limes, cements, and building stones, the beginning of which has been made by Mr. H. M. Ickis, field assistant; and (5) upon the appointment, in immediate prospect, of the other geologist authorized, to systematically examine the stratified economic deposits of the islands with particular reference to the development of deposits of iron and coal.

In practically all geological and other survey field work in the Philippines difficulties must be overcome due to the heavy vegetation, insect pests, heat, rain, lack of satisfactory maps, transportation, labor, and frequently of supplies, and to the menace, from constant exposure, to continued health and strength. That these difficulties have been overcome by United States troops and by prospectors in the past has been mentioned in previous reports of the undersigned, and that they are being surmounted now is continually being demonstrated by field parties from the army and constabulary and from various bureaus of the government, particularly of the department of the interior, operating and exploring in the remotest and most inaccessible portions of the archipelago.

The result of this work, largely untouched until within the past few years, is that the people, natural resources, and conditions of the islands are becoming better known, and knowledge obtained concerning them is being published in form accessible to the government and general public alike.

The time must inevitably come when the pioneer work, begun so many years ago, of exploring and developing these islands will have been complete; it is a privilege to be here now and to contribute in some small degree to this end.

PRESENT STATUS OF MINING.

Mining development is at present being carried on in Lepanto-Bontoc, Benguet, Bulacan, Rizal, Tayabas, the Camarines, Albay, Masbate, Cebú, and Mindanao.

In Lepanto, according to the report of Mr. Eveland, geologist, assessment work on gold and copper claims has been done to considerable extent, although much work at Mancayan has been prospecting only in the softer rock. Some earnest development work has been done, however, particularly at Suyoc, and at the present time it is understood that further serious development is going ahead at Mancayan upon a larger scale than before since the American occupation. Although timbering in some of the Lepanto workings is reported insufficient, that in others of them has been done in a thorough workmanlike manner. The miners of Lepanto have in general been working against many obstacles, not the least of which have been difficulty of transportation and supply, and a scarcity of funds. They deserve credit on the whole for what they have been able to do.

In Benguet much more important work has been done. On one lead at Antimok, Mr. Kelly has persistently developed his property, a promising gold lead, and has now gone to the United States, it is understood, for the purpose of purchasing a stamp mill complete. A little farther south Messrs. Petersen and Clyde are developing their claims in a business like way and are contemplating a stamp mill with dam, flume, and a turbine power plant. Farther south some unfortunate litigation has suspended work. The Philippine Gold Mining, Power and Development Company, of which Dr. J. F. Kemp is president, and Mr. H. J. Robinson is manager, are developing five gold claims about 4 miles from Kias, and have recently purchased, imported, and shipped to their mines a 10-stamp Hendy mill, with a Woodbury concentrator, a Blake crusher, a Pelton water wheel, capable of operating 60 stamps, and an assay equipment complete. For some time past Mr. Hartwell has been operating at a profit, it is understood, a 3-stamp mill built by himself in the Manila shops. This is the pioneer mill whose stamps have fallen during American occupation, and Mr. Hartwell deserves great credit for his energy, industry, and mechanical skill. Other gold properties are being earnestly developed in Benguet, a number of them promising success, and it is hoped that detailed information concerning them may be available at an early date. Copper has also been discovered in Benguet, and a number of copper claims have been located, recorded, and worked. The greater number of the copper ores of Lepanto and Benguet carry gold.

In Bulacan the iron deposits of San Miguel de Mayumo and Angat have been yielding sufficient ore for almost continuous smelting on a small scale for the casting of plow shares and points. Litigation, unfortunately, that should be brought to an early and definite conclusion, is still afflicting this small but prosperous industry at Angat. As shown in Bulletin No. 3 of this bureau, upon "A Geological Reconnoissance of the Iron Region of Angat," much of this ore is exceedingly rich and pure, and the deposits are believed to be extensive indeed. The chief of this bureau greatly regrets that up to the present he has been unable to interest the iron works and foundries of Manila in the investigation of these valuable iron deposits, so near at hand. It seems quite feasible to ship these ores to Japan, where the

demand, it is understood, is great, and the supply almost entirely of foreign origin. This matter, rendered more hopeful by the extension of the Manila and Dagupan Railway through the town of San Miguel, will be taken up with exporting companies at an early date.

In Rizal some prospecting has been done for coal and gold, and natural cement rock, and a number of gold placer claims have been located and worked to the north and west of the towns of Montalban and San Mateo. In some of these claims platinum occurs in small amounts, as previously stated in this report.

In Tayabas a number of claims have been recorded during the past year, including 22 petroleum locations. Details from these fields have not yet been obtained.

In the Camarines Province, notwithstanding the valuable concessions granted by the Crown of Spain in the gold districts of Paracale and Mambulao, practically no work, beyond the original restaking required by law, has been performed upon these claims. Extension of time for the legal performance of labor required by the Spanish laws under which concessions were granted has been generously granted by the honorable civil governor upon requests by the British and German syndicates, favorably indorsed by this bureau, but owing to difficulties due chiefly in securing capital in Europe and the United States, it is understood this time is rapidly drawing to a close and the cancellation of the valuable concessions, upon which much money was expended during Spanish days, seems the inevitable end. This is greatly to be regretted, but it is hoped that future companies may develop the gold deposits of Mambulao and Paracale to the extent they seem to deserve. Much prospecting has been done in the Camarines during the past four years, and a number of locations have been made in the above districts under the present laws. Placer and dredger mining, which has been so profitable here in the past, is reported as still capable of yielding important returns.

In Albay Province coal mining has been carried on particularly in the island of Batan on the east coast.

The Gil Brothers are reported to be developing a coal mine on the island of Batan in five seams, each 1 meter thick, of a good black lignite, with a force of Spanish and Japanese miners, and the report of the Japanese engineer who examined the "Bilbao" mine, upon which work is now being done, estimated that when fully opened up this mine should be able to produce 1,000 tons of coal per day. These expectations are yet unfulfilled.

In Batan Island, also, on the southwestern peninsula reserved for military purposes, Lieut. H. L. Wigmore, Corps of Engineers, United States Army, assisted by a detail of men, is prosecuting a thorough examination of the coal deposits by means of the diamond drill. The coal there is of excellent reputation and suitable for steamer use.

In Masbate much prospecting, assessment, and development work has been done, particularly at Arroroy, on the north coast. Three companies have been working there, and one of them has recently had completed in San Francisco and prepared for shipment a modern dredging plant complete. This company has also ordered a stamp mill for crushing its free milling ores. The prospects here seem bright.

In Cebu some prospecting and locating has been done upon coal deposits, but so far as known no real development has yet been accomplished since Spanish days. Within the last few months, however,

much interest has been shown in the extensive and valuable coal deposits of Cebu, and in the near future some activity in mining should be displayed.

In Mindanao, with the exception of the gold fields of Placer and Surigao, where a handful of earnest miners have been working for the past two years, the status is largely that of prospecting. New deposits are being looked for and the island is being gradually but extensively explored.

Through the courtesy of the chief of the bureau of public lands the following information was obtained showing new locations during the fiscal year 1904:

In Ambos Camarines, 10 lode claims (gold); in Batangas, 12 lode claims (not specified); in Benguet, 43 lode claims (gold), 8 placer claims (gold); in Bulacan, 2 placer claims (gold); in Capiz, 1 placer claim (gold); in Cebu, 2 placer claims (coal); in Laguna, 4 placer claims (not specified); in Lepanto-Bontoc, 36 lode claims (not specified); in Masbate, 25 lode claims (not specified), 25 placer claims (not specified); in Mindoro, 1 placer claim (gold), 2 claims (1 guano, 1 stone); in Misamis, 8 lode claims (gold); in Pangasinan, 36 lode claims (30 gold, 6 copper); in Rizal, 21 placer claims (11 gold), 4 placer claims (1 copper, 2 coal, 3 guano, 3 stone, 3 iron); in Surigao, 18 lode claims (gold); in Tayabas, 45 placer claims (1 silver), 12 lode claims (4 copper, 22 petroleum, 4 coal, 19 guano, 4 stone, 3 lead); in Zambales, 3 lode claims (not specified).

From the above it will be seen that there have been reported as located during the fiscal year 1904, ending June 30:

Lode claims	209
Placer claims	109
Total	318

Of these the following are represented:

Gold claims	132
Silver claims	1
Copper claims	11
Petroleum claims	22
Coal claims	8
Guano claims	23
Stone claims	8
Iron claims	3
Lead claims	3
Not specified	107
Total	318

The above shows a steady increase in prospecting, locating, and recording claims.

In addition to mining work proper, the allied mineral industries are yearly becoming of greater value and importance. Brick and pottery are being made by natives in a large number of provinces, limestone is burned for lime and it is hoped will soon be used for cement, and rock for building and other purposes is quarried and sold.

The quarries on the Island of Talim, Laguna de Bay, furnishing rock for the streets of Manila, and of Mariveles, furnishing rock for the works of the port, have been particularly active during the past year. The rock from the former is a typical dark basalt, and that from the latter a gray andesite in part with augite in important amount. Through the courtesy of Mr. L. F. Patstone, superintendent

of street construction and bridges, whose efficient engineering skill and ability is everywhere evident upon the improved streets of Manila, the following information is abstracted from his annual report: The rock for Manila is quarried at the island of Talim, Laguna de Bay, crushed at the plant there equipped with one 125-horsepower engine and three crushers with a combined capacity of 63 tons per hour, and brought to Manila in cascos, a distance of 27 miles. The force at Talim consists of a foreman, at $100 per month, and 1 quarryman, 1 engineer, 1 assistant engineer, 1 capataz, and 95 laborers, at ₱7, ₱3.50, ₱2.50, ₱3.50, and ₱1 per day, respectively. The amount of rock crushed during the year was 33,045 cubic meters, at a total cost for labor, coal, dynamite, powder, oil, and waste of $3,010.17, the crushed rock being delivered at the Bridge of Spain, Manila, at a cost of $1.18 per cubic meter. These figures show extensive work and are complimentary to those in charge.

Through the courtesy of the superintendent of the Atlantic, Gulf and Pacific Company, the following information has been obtained concerning the rock quarries at Mariveles, Manila Bay: The number of natives employed at the quarries is about 1,000, directed by a force of from 30 to 40 white men. There are excellent facilities for handling the rock and loading it upon barges for transportation across the bay. The company are using 18 derricks, with dummy engines and cable complete. The amount of rock quarried to date is about 603,000 tons and the amount quarried at present is at the rate of 20,000 tons per month. The native labor is paid on the average ₱1.10 per day and under proper supervision has been very satisfactory. The labor problem, in the opinion of the chief of this bureau, has been solved to the lasting credit of the officials and foremen of this company. The natives are content, enjoying complete community life, with houses, schools, and churches erected by the company, and they give a fair day's work for the wages paid. They are satisfied and the company, as a matter of fact, faces no "labor problem" at all.

In addition to the above industries, earths are dug from clay banks in many provinces for use in whitewashing and other wall decoration, and a mineral-paint factory in Santa Ana is doing an excellent business in paints made exclusively from Philippine earths. Plans are now on foot for a reorganization of this business, with largely increased capital, for the extension of its trade.

Mining labor has not yet been developed as such to any great extent in the Philippines. The Manila Street Railway Company, the city engineer and his corps of engineer superintendents, the Atlantic, Gulf and Pacific Company, and the bureau of improvements of Benguet, all employing large numbers of native laborers, have demonstrated a theorem suggested by this bureau two years ago: The success achieved is largely a matter of competent supervision exercised by the best foremen to be obtained. The Tagalogs, Igorrotes, and Bicols are reported to be fairly good quarrymen and outside men, and with able white foremen should be able to furnish the bulk of the labor required. True, natives can not perform the amount of work of an equal number of white men in the mines, but this need not prevent their use. The great gold mines of India and of the Rand are worked with native labor, and among these are 13 of the first 20 gold mines in the world. It should be borne in mind that there is no large class of natives in these islands as yet that has been tried in mines, and it

should be remembered that failure to succeed outside need not necessarily condemn labor underground. Conditions in mines are pretty much the same the world over, and labor that may be lazy, shiftless, and unsatisfactory under the tropic sun may prove excellent in the cooler air of the mines. A Spanish mining superintendent is authority for the statement that he could secure 65 good Visayan miners in the city of Cebu to-day and begin the development of any coal mine in that island; that, with these men instructing raw material, he could in time develop any reasonable number of miners required. He stated also that in mine timbering and in other precautions for safety the Visayan was as good a miner as could be desired. Why should these commendations apply to the Visayan alone? It is suggested that however unsatisfactory native labor may be now, a mining class can be developed under proper guidance and within a reasonable time. There seems to be nothing to prevent the importations of Japanese miners, as the mining bureau having shown to the collector of customs that a miner is a skilled laborer, the collector has rendered a decision to the effect that miners, other than Chinese, may be imported under the law. It is believed that a supply of mine labor can be developed under competent American or European foremen, or imported under the law, sufficient to work the mines of the Philippines.

The transportation problem is being rapidly solved. Vast sums of money are being expended annually by the insular and provincial governments in the all-important construction of bridges and roads; trails are being opened up and improved, railroad extension has already begun, and more is promised, with every indication of success. Conditions so discouraging a few years ago are improving so rapidly that it is not thought serious difficulty in transportation will much longer present itself.

Unsettled conditions due to brigandage and insurrection are no longer such as to delay the development of mines for twenty-four hours. The armed and organized insurrection against the United States has been effectually and it is believed forever suppressed, and the sporadic ladronism existing among wandering malcontents and carabao thieves, far from preventing the development of mines, is not of sufficient importance to prevent prospectors or miners from working in any mining district in the Philippines.

It must be admitted that the present mining legislation, comprised within acts 235 of the Congress of the United States and 624, 777, 859, 1128, and 1134 of the Philippine Commission, is far superior to the complex Spanish law, in that (1) it leads to the granting of absolute title, instead of a mere concession; (2) its processes are simple and its language concise, and (3) it encourages bona fide mining and tends to establish confidence in mines located and worked under the restrictions it provides. It is superior to the United States mining laws in that the uncertainties, litigation, and loss resulting from the so-called "apex system," granting extra-lateral rights, which has been fought by the ablest writers upon mining law in the United States for twenty years, and which obtains in the Western mining States only as a result of purely local conditions, has been entirely omitted in the framing of mining legislation for the Philippines, and all mines owned and worked in these islands under the present law

may at least be free from the feature that has proved most expensive and disastrous in litigation connected with mines in the United States.

On the other hand, section 33 of act of Congress of July 1 provides "that no holder shall be entitled to hold in his, its, or their own name, or in the name of any other person, corporation, or association, more than one mineral claim on the same vein or lode." This most unfortunate section will naturally operate against the development of any but the richest lodes, and in the Philippines, as in mining districts the world over, the bonanzas are few and the deposits of low-grade ores relatively large. In Lepanto and Benguet, as well as in the Camarines, Masbate, and Mindanao, there are important deposits that should be worked upon a large scale and which, under section 33, can never be worked at all. It is safe to say that under section 33 neither the famous Homestake nor the Alaska Treadwell mines would ever have been developed, and yet these are among the greatest gold producers known. The ore of the Homestake mines in South Dakota averages only $4, and that of the Alaska Treadwell only $2 to the ton, yet these mines, being able to handle immense bodies of ore, are among the best paying and soundest mines in the world. The former requires 900 stamps, yielding a monthly output of $375,000 of gold, and the latter employs 540 stamps, paying $130,000 a month.

The low-grade ore deposits in the Philippines are so extensive and valuable that section 33 tends to operate as an obstacle to the development of the greater part of our metalliferous resources. The chief of the mining bureau, the secretary of the interior, and the civil governor have repeatedly advocated and urged the repeal of this unfortunate restriction in act 235, and the sentiment of those interested in mining in the Philippines is safely unanimous in favor of such repeal. It is sincerely to be hoped that favorable action by Congress upon this important matter will not longer be delayed.

The development of the natural resources of the Philippine Islands means the development of the Filipinos themselves. It would seem to the best interests of the natives, as well as of the islands at large, to bring every natural resource into a high state of development and active yield. This implies the need of capital, and without sufficient security in number of claims for development capital will interest itsel in more promising fields than are presented here. Without development the greatest danger seems to be that the resources will remain idle rather than be exploited, and this at the real expense of the natives themselves.

THE MINERAL RESOURCES.

A map of the Philippines has been prepared in this bureau, showing the locations of the known and reliably reported mineral deposits of economic value. The map itself is based upon the latest Army Signal Corps map of the Philippines, the lines being omitted and the geological data being here introduced. A similar map upon a larger scale, equally self-explanatory, forms an exhibit of this bureau at the St. Louis Exposition. The artistic handwork upon both of these maps is the work of Hugo Navarro, assisted by Justo Reynoso, draftsmen of this bureau. To them just credit is due.

From interviews with prospectors, miners, and mining engineers

who have visited the mining districts; from authorities translated and studied; from the assay returns of the bureau of government laboratories, and from the field work of this bureau the following general and popular account of the mineral resources has been prepared. A more complete paper is held for data now being obtained.

Gold.—This meta' has been found in almost every island of importance of the group. It has been worked by natives in p'acers and in stringers from time immemorial, and the total production of the islands must have been considerable indeed, a though no reliable statistics have ever been kept. The manager of one of the loca banks is authority for the statement that at one time a great deal of nugget and other alluvial gold was received at the bank. Mr. Richard von Drasche, a German geologist who has done some field work in the islands, and has published important papers upon Philippine geology, states that at the time of his visit to Mambulao and Paracale (Camarines Province) there were over 700 natives work'ng the placer deposits for gold. It was estimated by a Spanish governor of Manila of the seventeenth century that the annual output of gold from Camarines Norte was about $200,000. This seems well within possibility, and is an indication of what was yielded to native methods. The natives in no part of the islands have been able to dredge or sluice, nor have they penetrated more than 50 or 100 feet into the rock at any p'ace. Abella states in his "Ligera Reseña de la Minera de las Islas Filipinas" that from 3,000 to 4,000 pesos worth of gold was taken annually from the streams in the mountains of Bulacan near Santa Maria de Pandi. This statement has not appeared elsewhere to the knowledge of this bureau, and it is not known upon what information it is based. It is believed, however, that a great deal of placer gold has been obtained in the past by natives of Bulacan. It has been estimated by Centeno (1876) that the placer output of the Misamis and Pigtao fields in northern Mindanao has been in the hands of the natives about $27,000 per annum; and Mr. Wi liam Asburner, an Amer'can mining engineer, states that he was informed that $20,000 worth of gold had been taken by natives from the p'acer fields of Surigao in northern Mindanao in 1882. No figures are yet available from Benguet or Lepanto but a prominent mining eng neer recently stated that during his visit last year in Benguet two American miners obtained 20 pounds of gold from rich stringers in seven days. It is known that some of these stringers worked by the nat ves have been enormously rich. The greater number of the richer placers readily accessible to man have probably been pretty thoroughly worked over from the surface, but it is known that the natives, and Spaniards also have seldom gone to bed rock.

From the P gholugan region, in northern Mindanao, Mr. J. Clayton Nichols, an American mining engineer, states that he was informed that $4,000 was taken 'rom one hole and $2,500 from another.

In the northern part of Masbate, near Arroroy, three American m'ning companies have recently staked out and recorded a large number of placer and lode claims, and work is going on upon these at the present time. It is understood that an Amer'can consulting engineer who has recently visited and reported upon this field was most favorably impressed with the outlook for mining the alluvial



TAAL VOLCANO. WEST WALL OF CRATER AND INNER CRATER QUIET. FROM EAST WALL.

Photograph by Worcester.



TAAL VOLCANO. NORTH AND NORTHEAST WALLS OF CRATER. EXTINCT CRATER CONE IN BACKGROUND. SURIGAO RANGE IN DISTANCE.

Photograph by Worcester.



TAAL VOLCANO. SOUTH AND WEST WALLS OF CRATER. FROM NORTHEAST WALL.

Photograph by Worcester.



TAAL VOLCANO. EAST SLOPE NEAR CRATER RIM.

Photograph by Worcester.

APPENDIX J.

REPORT OF THE SUPERINTENDENT OF GOVERNMENT LABORATORIES.

DEPARTMENT OF THE INTERIOR,
BUREAU OF GOVERNMENT LABORATORIES,
Manila, September 15, 1904.

With the completion of the new buildings the bureau of laboratories will enter on the second era of its existence. Heretofore it has not been able to cover the ground which it wished, and it has not been possible, excepting in a limited degree, to give facilities to persons from abroad who desire to complete scientific studies in the Philippines. However, with the changed conditions this disability will be removed, and from now on the bureau will be in a position to carry out one of its original plans of providing work rooms and appliances for investigators coming to the Philippine Islands from other countries. The value of such a course will be found not only in the general scientific advance of the world, but it also will be evident in the educational advantages which will be afforded the people of the Philippine Islands. It would not be possible for extended periods to receive scientific men of high standing among us without having persons not in any way connected with the government or with the laboratory force acquire a knowledge of the results achieved, which would be of lasting benefit to them.

The government has supported the laboratories to the very best of its ability. It has given all the necessary apparatus and supplies and has provided a structure which would be a credit to countries of larger wealth and resources. However, as it is with all other institutions of the character of this one, the funds immediately at hand are never adequate to accomplish all that is desired, and further development will mean further financial support. It does not seem unlikely that the aims of the laboratories would appeal to persons who have in the past felt inclined to donate money to American institutions, and the possibility of such gifts to this bureau must be considered.

The commercial interests of the United States which pertain to the Philippine Islands can best be advanced by an adequate and thorough knowledge of the archipelago, and not an inconsiderable portion of the information which is necessary must consist in the results of the study of the raw products. While the laboratories have endeavored to give as much time as possible to a consideration of these materials, nevertheless the work in the main has been discouraging because of the fact that adequate chemical investigation

necessitates an ample supply of the raw products; yet, under present conditions, as the influx must to a large extent come from persons not connected with the bureau, and hence not particularly interested in its progress, it has been almost impossible to secure authentic specimens in sufficient quantity for the prosecution of the work. Investigations which have been begun must very frequently lie idle because of lack of material for study, and this condition can only be remedied by the possession of an adequate force of collectors in the field. It would seem as if American business men interested in the development of the islands, either from a commercial or a philanthropic standpoint, would easily be made to realize the desirability of supplying the laboratories for three years to come with approximately $10,000 a year. This would enable us to keep four well-equipped parties in the field at all times, and would bring into the bureau the material it so badly needs. The results would more than repay the outlay.

Interest in tropical medicine has developed markedly of recent years, and it must be understood that not only has this branch of scientific work taught us to understand the Tropics to as great an extent as has any other field, but it has reacted beneficially upon medical knowledge in temperate climates, and much has been learned from the facts gained near the equator which has been of advantage in the practice of medicine at home. Our knowledge of bacteriology and of the cause and prevention of disease in general has been materially widened by a study of the infections peculiar to warm countries, so that, to cite the case of amebic dysentery, epidemics which have occurred in temperate climates have been recognized as such by the aid of facts discovered in the Tropics. For this reason, and because interest in the foundation of institutions for medical research has been increasing in the United States, it would not seem unlikely that some funds could be obtained for the study of tropical medicine, either as library donations or by supplying investigators with funds for the journey across the Pacific and for their maintenance while in Manila. It will be recalled that the marine biological station at Naples is to a certain extent supported by subscriptions from various colleges and universities throughout the world, these institutions having the privilege of placing one or more students in the laboratory as a return for their outlay. The bureau of government laboratories in Manila, with its present facilities, would be an institution to which universities could subscribe with as much justice and as great advantage as they now do to Naples. If a number would agree to give $1,000 a year toward the maintenance of the laboratories, the latter in turn would unquestionably admit free of charge and would furnish all facilities to a certain number of advanced students from each institution which had such a connection with the bureau. The results of the research so accomplished could be given out in a series of monographs in which the universities giving the aid would receive due recognition, and the manuscript would also be available for publication in whatever journal the author saw fit to place it.

The past year has not brought any advancement in the proposal to establish a marine biological laboratory. Interest in this branch of science has grown rapidly in the United States, where the advantages of the study of marine fauna and flora have been thoroughly recognized. Possibly it would be feasible to obtain a sufficient gift

of money to erect the buildings and establish the laboratory if the government would agree to maintain the institution afterwards. The field laboratory could be placed in some favored situation on an island to the south of Manila, where the investigators would be able to have access not only to deep water but also to the shoals and currents caused by numerous channels, such as can be found in the neighborhood of Busuanga; the central laboratory would be established at Manila, and in connection with it a public aquarium, the admission to which would to a certain extent defray expenses, would be advisable.

The botanical laboratory, touching, as it does, so closely upon the commercial interests of the islands, is also a division of the work which might justly receive partial support from outside sources. The library has been founded by the Commission, but because of the great variety of work which must find its literature at hand in the islands it could be expanded to double its present size without being open to the criticism of being extravagantly planned. The government has done its share, as far as it is able to do so, and it is to be hoped that some one may be found sufficiently interested in the scientific development of the Far East to provide the institution with additional funds for the purpose of increasing the literature at hand and for the purchase of more expensive sets of periodicals.

It would seem advisable to give the superintendent authority, when he visits the United States, to canvass the field and to discover what donations, if any, can be secured. While such a course would involve travel and an outlay of time, its results, even though no actual donations were secured in the first year, would in time unquestionably amply repay the expense.

During the past year the laboratory force has been increased through the efforts of the honorable the secretary of the interior, who, during his leave in the United States, visited the majority of the prominent educational institutions and secured laboratory workers of a very high type. By this means there were brought to the laboratory staff a pathologist, Doctor Herzog; a chemist and investigator, Doctor Clover; a botanist and plant physiologist, Doctor Copeland; two botanical collectors, Messrs. Elmer and Whitford; a chemist, Mr. Richmond; and two research workers from Harvard University, Doctors Brinckerhoff and Tyzzer, who, through the activity of Doctor Councilman, were provided with funds to prosecute investigations on the subject of variola in the Philippines Islands. The thanks of the bureau are extended to him for his earnest efforts in its behalf.

Another advantageous result obtained by this personal visit to the American institutions was found in the fact that the laboratories became known and the scope of their work understood, so that it is believed the great difficulty in securing men encountered in the past will not be met with in the future. However, it must be realized that the journey to the Philippines is a long one and that many persons who otherwise would gladly accept the opportunities offered hesitate to do so because of the length of the journey and also because of the reputation which Manila has or being an expensive city to live in.

The fear of scientific isolation should grow less and less as the knowledge of the character and the standing of the laboratory and

place was taken by Dr. Paul G. Woolley, formerly in the biological laboratory, who has been assistant director since February 1, 1904.

As heretofore, the preparation of antirinderpest serum and of vaccine virus has constituted the bulk of the work, yet other lines have also been undertaken. The proof brought by this laboratory deserves especial attention that Texas fever in reality exists and probably has existed in the islands for a number of years, so that all imported Chinese animals, including those from practically all far eastern ports, as well as cattle native to the Philippines, are practically immunes to the disease. Therefore, animals arriving from nonimmune districts are sure to be attacked if they are not previously immunized, for a tick (*Boophilis australis*) capable of transferring Texas fever has been found in large numbers in the Philippines. The work of identifying this arachnida and of classifying it was done by Mr. Charles S. Banks, entomologist, now on leave in the United States, and a brochure on the subject was published in conjunction with the Texas-fever bulletin of the serum laboratory.

The veterinary surgeons and inoculators of the board of health up to March 1, 1904, carried on provincial rinderpest inoculations under the guidance of the director of the serum laboratory. After that date the veterinary corps was organized as a division of the board of health, and all of this work, as it should be, is now in charge of that bureau. The laboratories only furnish the serum for rinderpest inoculations. During the period of laboratory supervision the results of provincial work continued to be even more encouraging than heretofore. The details up to the time of transfer may be found in the report of the director of the serum laboratory.

The other serums which have been issued at the laboratory, or which are in the course of preparation, are diphtheria, plague, and tetanus antitoxins.

The preparation of vaccine virus has been carried on without serious interruption, but experience has demonstrated that it is not wise to make this prophylactic during the hot season. Extra precautions were taken to cover the stable for calves with a shelter roof of nipa in order to keep it as cool as possible, but nevertheless a large percentage of the virus obtained during the months of April and May was of inferior quality. With the advent of cooler weather the difficulty has gradually disappeared. The new vaccine stables, to be located at the main laboratory building, will not be of a temporary nature and will be constructed so as to give the best possible results.

The director of the serum laboratory, during the latter part of 1903 and the first months of 1904, practicaly had charge of the health of all carabaos imported from Shanghai. The appearance of surra among the herds after the disappearance of hemorrhagic septicæmia and the fact that no adequate location was available in the neighborhood of Manila greatly increased the responsibility and anxiety of the undertaking. Under the circumstances, the very best course possible was pursued, that of engaging a large pasture near Santa Mesa, which acted as distributing point for the animals, but owing to its proximity to Manila surra finally attacked the animals even in this locality. Because of the knowledge that this fatal disease would probably sooner or later enter the herds at Santa Mesa, the superintendent of government laboratories, even before the actual outbreak, visited several of the islands of the archipelago by direction of the

civil governor in the hope of possibly discovering a suitable and isolated pasture ground to which imported animals could be sent. The islands of Romblon, Sibuyan, Tablas, Masbate, Mindoro, and Burias were visited, and with the exception of the last named all localities presented serious objections to the herding of animals which, like the carabaos, need large quantities of water, because in most instances the streams which watered the pastures practically became dry during the season of no rain. Burias, however, seemed to present an ideal condition, so that finally this island was decided upon, and after February 17, 1904, all animals imported from China were shipped to San Pascual, which was a former Spanish penal settlement on the island of Burias. Starting from this point, they were allowed to graze over the pasture land of the northern part of the island. This location made such a favorable impression that it was suggested as a permanent cattle station for experimental purposes when it is no longer needed for the use of the animals purchased for distribution.

Surra among carabaos does not seem to have the same invariably fatal results as it does with horses. Certainly a number of the animals, as will be seen from the report of the director of the serum laboratory, have not died in the herd which became infected on the island of Negros, but on the contrary at the present time the cattle are well and able to work.

The report of Dr. Paul G. Woolley covers the period from June 15 to August 30. As it deals with so short a period its recommendations need not be especially dwelt upon, but attention is called to the fact that in the serum laboratory as much as in any other the value of research work is apparent. The last word on the manufacture of serums and prophylactics has not by any means been rendered. Indeed, the science of serum-therapy may be said to be in its infancy. In no other place can the government derive more benefit from painstaking investigation than in this division of the bureau of government laboratories. Some advance was made in the past year by securing the services of Doctor Ruediger as bacteriologist, but even under these improved circumstances so much of the time of the force is taken by the actual care of the animals and in making the serums for which at present there is a demand that but little of it can be given to improving the products or to the study of possible substitutes for the serums at present being prepared. The bureau experienced much difficulty in engaging a man for the position of assistant director, and at the present time research has practically been abandoned, but nevertheless this vacancy has not been lost sight of and it is hoped that it may be filled as soon as possible.

The bureau has been fortunate in being able to obtain from its own force men capable of so successfully conducting the serum laboratory, and the work which they have done should be duly credited. In the future, however, it is certain that if we wish to maintain a high standard greater facilities for research work must be afforded the employees engaged in this division, and the plane of salaries must be brought to a higher level.

But few improvements have been placed on the temporary grounds at San Lazaro during the year past, because it was known that in a short time that portion of the work which involved the use of the calves and horses would be transferred to the central laboratory

grounds, leaving only the rinderpest cattle at San Lazaro. The changes consisted chiefly in improvements on existing buildings. When the serum laboratory is installed in the new quarters it will be extremely advisable, when funds are available, to find land nearer the present laboratory building than is San Lazaro. The distance from Calle Herran to San Lazaro is nearly 2 miles, and consequently supervision of the work is handicaped very greatly. The director of the serum laboratory and the superintendent of government laboratories a year ago recommended a piece of city land in the barrio of Paco as the most available for the purpose of keeping the cattle. However, at the present time the cost of this transfer and the filling of the grounds would be too expensive to consider.

The difficulties formerly encountered in the keeping of small animals have been overcome, at least at present, and the laboratories now have available a good supply of guinea pigs, rabbits, white rats, and mice. If no epidemic disease is encountered it is hoped that we will no longer be compelled to purchase any of these necessary adjuncts to biological work in Japan. Nevertheless, it must always be remembered that in the Tropics, where such small animals are especially susceptible to outside influences, the occasion may come when the entire collection will be swept away by some epidemic disease.

BOTANICAL WORK.

During the past year efforts have been made to expand and improve the botanical work carried on by the bureau for the various portions of the civil government in need of this class of assistance, and at the same time an endeavor has been made to increase the herbarium to the point at which it may be considered to be a thoroughly satisfactory working collection. To this end, through the assistance of the honorable the secretary of the interior, Doctors Copeland and Whitford and Mr. Elmer were engaged, the first as systematic botanist and the last two as collectors, and by reason of this addition to the force material has been coming in with great rapidity. However, it must be borne in mind that systematic botany and the building up of the herbarium are simply means to an end. A knowledge of the flora of the islands is necessary before any great advances can be made in other branches of botany, and an herbarium is to be considered somewhat as bearing the same relationship to the botanist as a library does to other scientific workers, but the best results and those of the highest type can not be obtained except by extending into new fields. With this end in view it has been decided, as soon as facilities are available, to have Doctor Copeland take up the study of plant growth and physiology at the new forestry reserve at Lamao, where it is hoped a small laboratory can be erected for the purpose of carrying on his investigations. Doctor Whitford will also undertake some systematic study of forest flora in this district and in that way an application of the knowledge gained by study of the herbarium will be made. This will leave for actual systematic botany Mr. Merrill and Mr. Elmer, so that the growth of the herbarium in the next year will not be as rapid as it has been the past.

Many duplicates have been sent to various institutions for distribution, and this policy will be continued, so that botanical workers will come into close relationship with other devotees of this science in

foreign countries. It is very desirable that the identification of the specimens in the herbarium be carried on as rapidly and completely as possible. Much can be done here, but many portions of the work must necessarily be undertaken in localities where large permanent herbaria are accessible. For that reason it is suggested that at the close of this fiscal year Mr. Merrill be directed to proceed to those cities in Europe in which large herbaria are available. The time used in this way should occupy at least eight months, in order to cover the ground of identifying and classifying such portion of the material upon which we have not been able thoroughly to decide.

As soon as funds are available it would be extremely desirable to obtain a good investigator who has specialized in plant pathology. The economic importance of plant diseases is not less than is that of planting and growing. Valuable crops, which might be flourishing were it not for the ravages of disease, might very well be saved by the intervention of the laboratories if they possessed a man thoroughly schooled in this branch of work. The superintendent hopes that the botanical work may be expanded in the near future and that the plant physiologist and plant pathologist can be given positions where they can carry on their work with success. Private donations might be secured for the purpose of developing the botanical laboratory. All has been done that is possible with the means at hand, but the future must certainly show an advance, as the past has shown a beginning.

The thanks of the bureau are extended to the bureau of forestry for the many courtesies it has shown and for the great interest it has taken in this work. Its cordial cooperation in Lamao will certainly do much to advance interests of botany in the islands. Further particulars in regard to botanical work will be found in the report of Mr. Elmer D. Merrill.

BIOLOGICAL LABORATORY.

During the past year the clinical work in the diagnosis of disease performed by the biological laboratory has quadrupled, and this increase is perhaps the most notable feature of the laboratory work. Research, of course, is carried on as much as possible, and its results are shown in the laboratory bulletins which have been published and made public by this means, but the record of clinical work appears only on the books of the institution. It will be seen that the public is increasing its demands on this laboratory, and is reaching a better understanding of the necessity of accurate diagnoses. As this recognition grows it is certain that the native population, which, up to a few years ago, has been practically ignorant of the modern methods, will become educated to their value and in that way clinical diagnoses made by the laboratory will become as great a factor in prophylaxis as any other branch of sanitation. An average of 100 examinations a day is a large one, and it necessarily occupies a large proportion of the time of the force. Indeed, the danger with the present number of workers is that they may become discouraged in their outlook and stunted in their scientific development by too much routine rather than that they will not have enough of this class of work to do. The major portion of the clinical work and examinations, as Table 1 will show, has been for gonococci for the board of health and for surra, the latter determinations being necessitated by the fact that the government has been importing large numbers of animals.

The biological laboratory was fortunate in securing the services of Dr. Maximilian Herzog as pathologist. Doctor Herzog entered the service in February, 1904, and since that time, in addition to a large amount of autopsy work, he has found opportunity to prepare two papers for publication and to have one nearly completed.

The effort of the laboratories to provide and care for a pathologic museum has been continued. Heretofore, in the old quarters, it has not been possible to separate and to properly classify the specimens which have been prepared, but now it is hoped that this important branch of the biological work will be placed in a good condition and will be subject to a steady growth. The collection will ultimately become too large for the present building, but it is hoped that by that time a permanent Philippine museum will be completed, in which all of the material not needed for immediate study can be placed and utilized by the general public.

The laboratory has especially, through the efficient work of Doctor Musgrave, continued the study of the appearance of amebæ in the Manila water supply as a branch of a general research which Doctor Musgrave and Mr. Clegg were carrying on on the subject of amebic dysentery. Chemical analyses of the water have been regularly completed by the chemical laboratory, and bacteria counts were made in the biological laboratory as early as the year 1902, but neither of these determinations would have shown the danger incident to the water supply had it not been for the work which demonstrated the possibility of diagnosing the presence of amebæ in drinking waters, and to which attention was called by the director of the biological laboratory in his annual reports of 1902 and 1903. Chemically and bacteriologically the water of Manila has been very good during the past year, but for purposes of drinking it must be condemned unless previously boiled, because of the continued presence of amebæ. It is hoped that collaboration with the office of the city engineer will develop feasible methods of eliminating this source of danger from the new water supply which is soon to be installed, and to this end the laboratories will continue their investigations. So far the experimental filters constructed at the engineering shops have not been able to remove the organisms.

Although a large proportion of the work on the study of the diseases of cattle and the management during the first part of the year from a sanitary standpoint of the importation of these animals was under the direction of the serum laboratory, nevertheless the greater proportion of the diagnostic work was carried on by the biological laboratory, and on three occasions it has been necessary to send members of this force into the field for performing diagnostic work. For this purpose microscopes for travelers have been ordered and the laboratories are now in a position to thoroughly cover any outside field work which is necessary. A large proportion of these outside examinations have been for surra. The further particulars in connection with diagnostic work will be found in the report of the director of the biological laboratory.

Researches of an especially noteworthy character have been carried on by Doctor Strong on a practical cholera vaccine, by Doctor Herzog on bubonic plague and other subjects, by Doctor Wherry on the morphology of the cholera spirillum under varying conditions of

environment, and a paper by Doctor Strong discussing some new phases of the theory of immunity, is in preparation.

The entomological division of the biological laboratory has been increased by engaging Mr. Willie Schultze in addition to Mr. Charles S. Banks, after Mr. Webb, who was in the islands for a short time as assistant entomologist, had left for America without having obtained any satisfactory results. The collection of insects has been materially increased during the past year, and a representative portion of it sent to the Louisiana Purchase Exposition at St. Louis. The assistant entomologist, Mr. Schultze, has made several trips into the provinces for the purpose of studying insects which are attacking the cocoanut trees, and his results will be published in connection with laboratory bulletins discussing this important topic.

Work on the breeding and cultivation of butterflies and moths with a view to producing silk of a marketable quality has also been begun.

The work both of botany and entomology are being carried on in rooms which were originally intended for bacteriological investigations, these branches of science having been transferred to the laboratories after the original building plan was completed. Herbaria and exhibits of insects of necessity occupy a large amount of space and need permanent and dry quarters, which it is hoped will be supplied when the new wings are added to the present building. That portion of the addition which is designed to accommodate the forestry bureau has in its plan a large space for an herbarium and for museum purposes. The collections of this bureau are daily increasing in value, and it is hoped a permanent place will be found in the museum for such portions as are not in daily use.

During the past year it has been easier to supply the biological laboratory with experimental animals, owing to the fact that the serum laboratory has been able to place the stock in better quarters and to have some results with breeding. Animal houses of a sanitary pattern have been planned to be placed near the laboratory structure, and work upon them will be begun in a very short time. The intention is not to have these additional structures as breeding places, but to use them for experimental animals and for a certain number to be kept in stock at the laboratories for biological work, the greater portion being retained in the breeding houses at San Lazaro.

CHEMICAL LABORATORY.

As is the case with the biological laboratory, routine analytical work in the chemical laboratory has been largely increased during the past year, and the growing demands of the public make it more difficult for the workers to secure any unbroken time for research. Chemical investigation is of a peculiar nature in so far as it requires the arrangement of complex apparatus and appliances. Very frequently operations which have been begun must necessarily be pushed through to completion or otherwise the materials will spoil and the work must be commenced anew. This of course incurs a loss both in time, apparatus, and chemicals, so that it is in the interests of economy so to arrange the force as to give some of its members opportunity to pursue investigations without interruption. The chemical laboratory has also been handicapped during the year

by sickness among its members, which necessarily threw a large proportion of routine work upon those remaining.

The natural products of the islands, as is well known, are in an undeveloped state, and only by thorough research can all the conditions of their occurrence and all of the facts as regards their value be determined. While it might not at once be apparent that the money spent in investigations is well invested, the returns in the course of time would amply justify any outlay, and the longer the delay which is experienced in beginning these investigations, the later will be the time when the results may become available for the general public. In the new building apparatus such as stills, extractors, vacuum driers, etc., will be on hand, and therefore the appliances necessary for commercial chemical research will be available. However, unless a sufficient corps of men is provided fully to utilize these facilities, they will not meet the ends for which they are designed. It is probable that no great loss has been experienced in the past by the lack of an ample working force, because of the inconvenient quarters formerly occupied by the chemical laboratory, and because of the fact that lack of field parties has not rendered it possible to systematically secure large amounts of material for investigation. However, in the future it must be borne in mind that either through private subscriptions or by government aid a material increase in the chemical force must be made in order to secure the results looked for. A chemical investigation, if thoroughly carried out to secure reliable data and which finally will provide directions for new methods of manufacture or for new uses of old products, takes time; sometimes a year or more is consumed in obtaining results which are of value, because the worker at all stages needs to exercise ingenuity and skill. In meeting new conditions he is practically at all times an inventor. For the above reasons it is to be regretted that the financial condition of the government is such that the force in the chemical laboratory has been curtailed by two individuals, and it is hoped that as soon as the resources will warrant these places will be refilled by men thoroughly trained and equipped.

As an example of the possible advantages of investigation may be cited the fact that a number of the cheaper gums and resins in these islands, on distillation, apparently yield solvent oils similar to turpentine or to the higher boiling products of terpene distillation. These oils would be valuable for varnish manufacture, but at present it is almost impossible to learn the distribution of the trees and the amount which can be produced in the various provinces. An expenditure of time will also be necessary in determining the drying properties, ability of withstanding weather, etc., of these new products.

Work on the minerals of the islands has been continued as rapidly as possible, but here again the results have been more or less fragmentary and have depended upon such material as may have been received by the bureau. The cooperation of the mining bureau in this matter has been promised and it is expected that in the future, progress in a systematic way may be readily accomplished. The problem of the coal supply of the islands is an extremely important one, and here again the field worker must combine with the chemist in the laboratory to produce the best results. The coal deposits should be systematically and thoroughly explored and in the end an official statement published which will give to the world data in such

a form that investors may know exactly what to expect by a study of results obtained by modern analytical methods. While the older publications of the Spanish Government have been of value, the chemistry of coal has advanced so materially in recent years that much of the work needs to be done anew both by the mining bureau and the government laboratories. Some petroleum deposits have been discovered in the islands, but as yet the data obtained have been scanty. Mr. F. A. Thanisch undertook a trip to Cebu with the purpose of investigating the conditions with reference to cement production. Owing to the difficult nature of the country and the bad roads, he accomplished but little in the direction indicated. He went to one of the petroleum wells, but found it in disuse. The samples of limestone and clay which he obtained are now being analyzed in the laboratory, and enough has been learned to render it probable that if a properly equipped field party could devote itself to the question of cement production for at least six months or a year, and if the laboratories could, through its activities, obtain complete analytical data, the founding of a new and important industry would be close at hand.

Cement is cited only as an example of what might be accomplished, and for this reason it is believed that the statement is justified that no better investment could be made than to procure for the laboratory a sufficient number of chemists to thoroughly carry on such exploratory work in the provinces as is not within the province of the mining bureau and to pursue investigations in Manila. Presumably the field parties of the mining bureau will, in the future, bring in a large number of specimens, and, as all accurate mineral analyses take time, it is probable that for this alone an increase in the working force is justified. Further details of the results of mineral analysis can be seen from the report of Dr. A. M. Clover.

The investigation of cocoanut production, with the especial view of determining the relationship between the environment, the nature of the trees, and the percentage of copra and oil produced, has been carried on as occasion warranted during the past year. In order to obtain more complete results, Mr. Herbert S. Walker was spared from the laboratory during a period of two and a half months and took up his quarters at the government farm at San Ramon, where cocoanut trees are abundant. He transported with him drying oven, balances, and such simpler chemical apparatus as could be used in the provinces, and at the farm he prepared quantitatively a large number of samples of copra from trees of his own selection, not only from selected nuts, but also from large piles ready for copra production, so as to obtain a commercial average. The finished copra prepared by Mr. Walker was sent to the laboratory for oil determinations, and the complete results, utilizing both the San Ramon figures and those obtained in Manila, are now being compiled for the purpose of publishing a bulletin on the subject. About one hundered oil analyses still remain to be done before the work will be completed. It has been shown that the percentage of oil varies materially as between certain classes of trees, and that certain individuals throughout bear better nuts than others, but even the very best trees may show a considerable number of inferior fruits in which the weight of copra is much less than it should normally be. Mr. Walker has also studied the question as to how long a time nuts may be allowed to remain after picking before copra is manufactured from them without a loss in oil, and he has

studied the age of the nut in its relation to oil production. Several other chapters on the cocoanut-oil investigation remain to be finished, one in regard to the physiology of the tree and the relation of its growth to environment. This is a subject for the study of a plant physiologist, and as soon as opportunity offers Doctor Copeland will proceed to San Ramon to carry on investigations in this direction Another interesting phase is the growth of the young cocoanut sprout and the relationship between the embryo and the nourishment present in the growing nut. These branches of the work will occupy some time and hence the other publication on the oil production will be prepared first.

During the year Mr. Bliss has made a large number of analyses of the water supply of Manila, and his figures, showing maxima and minima, are appended in Mr. Clover's report. This chemical investigation again has served to demonstrate the fact that at least to a large extent all chemical work on drinking waters is useless, because the danger to the public from such waters lies not so much in the chemical composition as in the presence of micro-organisms. Water which may be perfectly admissible from a chemical standpoint may, from a biologic one, be dangerous.

The routine work of analysis in the laboratory is given in the appended table. A large proportion of it has been performed by Mr. L. A. Salinger in a most efficient manner, and in the last few months Mr. George F. Richmond has been able to take the greater proportion of the samples submitted by the custom-house.

The laboratories have now been in operation very nearly three years, and although supplies have been renewed from time to time, an annual order for articles which have become useless or for items which are needed for efficient work, and which owing to their nature may have been omitted from the original orders, will be necessary. The last large order was authorized some eight months ago and another one is being prepared to submit to the Commission. It must be borne in mind that, although the laboratories are thoroughly equipped, with the increase in the staff of workers and with the development of the knowledge of conditions some additional permanent apparatus will be needed, although the expenses in this direction will not compare with those of the original installation.

Dr. Gilbert N. Lewis, who has been appointed to take charge of the division of weights and measures, reached Manila on September 7, 1904, about two weeks before his laboratory rooms could be completed.

A short journey into the provinces will convince anyone that the confusion existing by the use of many different standards of measures and of weights is such that commercial transactions are rendered extremely complex and the chances for fraud multiplied. We have the metric system and superimposed upon it, since the arrival of the Americans, the English system of weights and measures. We also have measures of a somewhat indefinite character, known as manojos, gantas, cavanes, piculs, etc., all of which theoretically have a metric equivalent, but which practically vary from province to province. In the northern provinces there are some peculiarly objectionable standards, known as the uyon and baar, which apparently have different metric equivalents in different regions, and none of which we have been able successfully to reduce to any standard.

In undertaking a review of the weights and measures of the islands it will be absolutely essential, in the first place, to ascertain what measures are really in use, and to this end a considerable portion of the time of Doctor Lewis during his first year in the islands must be taken in preliminary work on this subject both in Manila and in the provinces. When a thorough understanding of the conditions is reached then it is hoped a law will be passed making the metric system the legal one in the Philippine Islands and giving the metric equivalent of all of the other popular standards. It does not seem reasonable or expedient at once to abolish the names for measures and weights which have been in use for so many years, but it will be feasible to prepare a legal equivalent for them in the metric system. One difficulty heretofore experienced has been in obtaining suitable blanks which can be standardized and issued to the various provinces, but it is believed that data are now at hand by which these necessary adjuncts can be purchased.

BUILDINGS AND GROUNDS.

Enough has already been said in the past reports in regard to the new building to render further remarks in this connection unnecessary. Suffice it to say that from all present indications it will be perfectly satisfactory and of sufficient capacity to handle the work. While the floor space may seem large, it must be remembered that a room which will accommodate three or four clerks might be only sufficient for one scientific worker. Already it is obvious that all of the rooms will be occupied, but it is also true that each room will be able to take into it a larger number of workers than are at present available. Expansion will take place by putting more men into the individual rooms and not by utilizing space which at present is unoccupied.

The serum laboratory will have that portion of its work which relates to the preparation of vaccine virus and serums, the production of which depends upon horses, transferred to the new building, but there will still remain at San Lazaro the large herd of cattle for rinderpest inoculations. The amount of rinderpest serum which has been used during the past year has been so great that the latter herd has been increased to about 120 animals. They can still be accommodated in the present buildings and in the grounds at San Lazaro, but their permanent retention in this location necessitates a great loss of time, because the distance to the San Lazaro estate from the laboratories is over 2½ miles. Another objection to these grounds is found in their limited area. For the best welfare of the serum herd the cattle should be allowed to graze, but the space at present available is too small for this purpose. The superintendent therefore reiterates his recommendation that as soon as possible some adequate space be found for these animals nearer the laboratory building, in Paco or Santa Ana. A number of repairs will be necessary at the present location, as the buildings are only of a temporary nature, being so built because of the supposition that all of this work would be transferred in the near future.

When the laboratory structure at Calle Herran is completed and the filling of the grounds is done, provisions will need to be made for the care of the latter.

GENERAL REMARKS.

The steady growth of all the laboratories in the last two years has demonstrated that the plan originally adopted was the wise one, and that development in the future may be expected in the same degree as it has occurred in the past. In this connection the superintendent of government laboratories wishes to again urge the necessity of adequate quarters for the employees of the bureau. All of the men engaged in scientific work are college graduates, they have been accustomed to pleasant surroundings at home, and a discouraging feature of their arrival in the Philippines is the difficulty in securing even presentable rooms. In a country like this, where hygienic surroundings are of the highest importance, and where sickness causes such a large decrease in the normal efficiency of a working force, it is highly desirable that the members of a staff should be able to find suitable and healthful accommodations upon their arrival. Many of the laboratory workers at present live in small rooms and take their meals at various restaurants, where both the food and the drinking water are unreliable. Buildings in the form of bungalows, with suites of rooms able to accommodate a number of men, would give the proper hygienic surroundings, and where enough are located in a group they will be able to manage their own table in such a way as to reduce the danger of infection to a minimum.

In the last annual report the superintendent of government laboratories called attention to the advisability of modifying the original laws under which the bureau was organized, and a draft of an act providing for this reorganization was submitted to the honorable the secretary of the interior. Perhaps it is as well that this draft was not acted upon for some time, because changes in the conditions and the addition of new branches of work would have rendered some modifications necessary; but nevertheless it is again urged that, with the new building, the engineering force, and the increased necessity for general supervision of all laboratory work, the new law will be most advantageous in fostering the interests of the laboratories.

I am, very respectfully,

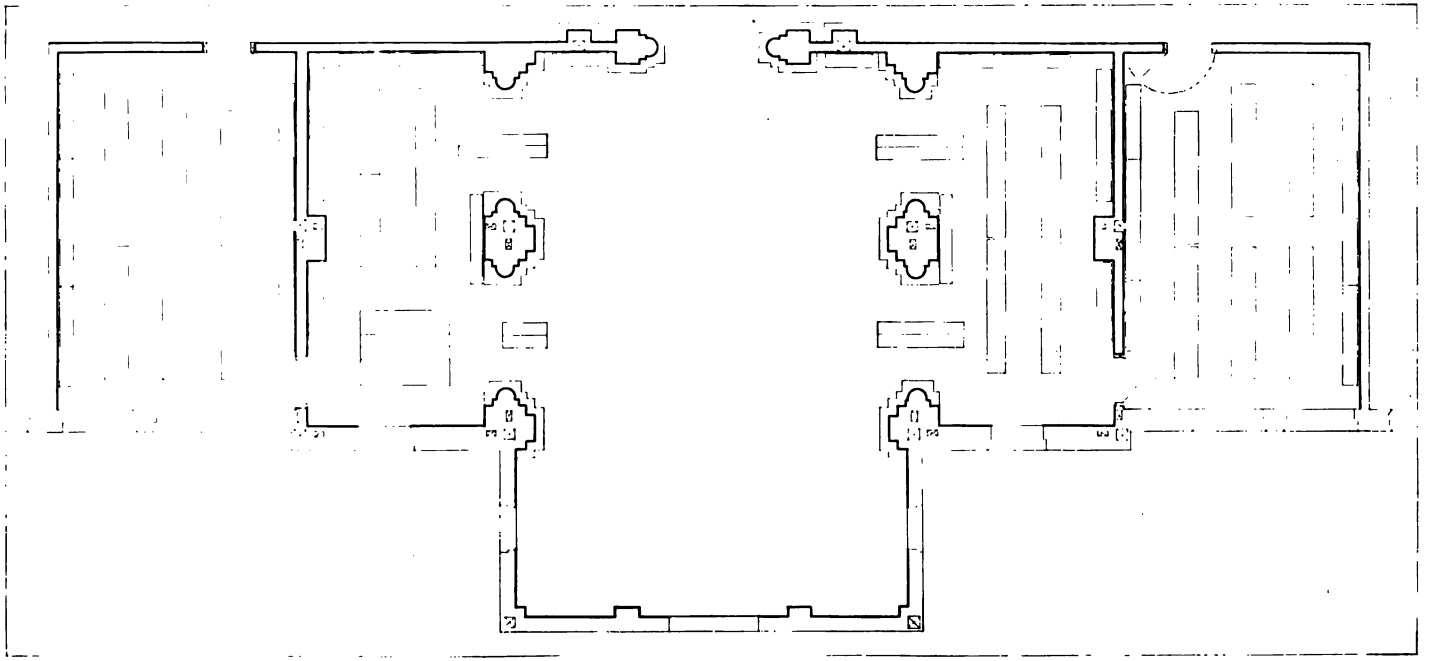
PAUL C. FREER,
Superintendent Government Laboratories.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

REPORT OF THE LIBRARIAN, BUREAU OF GOVERNMENT LABORATORIES.

The library has steadily grown during the past year. Many books and sets of periodicals ordered during the preceding two years have been received, and the number of current subscriptions greatly increased. Orders have been placed during the year for many valuable publications, a number of which have not as yet reached Manila, while many of them are already on the shelves. Recently delivery has been more prompt than in the past, but there still remain a large number of publications, including more than 70 sets of periodicals, ordered and not yet received. List A gives the subscriptions to current periodicals and B that of publications ordered but not as yet on hand.

The scope of subject-matter covered by the library has been greatly increased by transfers and by additions to the literature of new divisions. A large number of botanical works has been transferred from the bureau of agriculture and the bureau of forestry, and other botanical publications have been purchased. The library is indebted to Dr. David Prain, director of the Royal Botanic Garden, Calcutta, for a complete set of the valuable "Annals"



GOVERNMENT LABORATORY. C. FLOOR PLAN OF LIBRARY ROOMS.



of that institution. Many entomological titles have been added, and many more ordered. The chemical and biological departments have been enriched by the addition of a number of valuable books and sets of periodicals. The list of publications on veterinary medicine has been greatly extended, as has also that of industrial chemistry, and these collections will be made more valuable when the present outstanding orders are filled. These divisions will also be greatly benefited when we receive complete sets of United States and foreign government reports, of which we now have on hand approximately 2,500, catalogued by author and title and also by department publication number.

The library is now located in the new laboratory building on Calle Herran, where the rooms set aside for its use are admirably adapted for their purpose. It occupies a main reading room in which are placed current periodicals, reference books, and latest volumes received; four alcoves adjoining, three containing book stacks, and one reserved for a work-room for the preparation for the shelves of incoming publications, and two side rooms, each 16 by 24 feet, containing stacks. The available shelf space in these rooms is approximately 4,500 feet. The stack rooms are fitted up with adjustable metal stacks, are well lighted and ventilated, and provided with wide aisles. The main reading room is furnished with a desk, card cabinets, reading tables and chairs, revolving bookcases, shelves for current periodicals, worktable, etc., made of native hard wood (narra). Provision is made for adequate artificial lighting and ventilation, so that one may read with comfort at any time during the day or in the evening. (See floor plan of library, C.)

The care of books is a vital question in library administration in Manila. In addition to deterioration from use, shelf wear, dust, etc., damage from insects and mold must be guarded against constantly. Books must be inspected daily and wiped off very frequently during the rainy season, on account of the mold, and constant vigilance must be exercised to protect against insects. We have found a varnish made from a formula (see Table D) prepared by two members of the laboratory staff to be very valuable in the care of books. This varnish dries very quickly, does not injure the books, and is a partial protection against the accumulation of mold. Cockroaches, which are great pests, and are especially troublesome in eating covers of cloth-bound books, apparently do not attack them when they are treated with it, and theoretically, at least, it is a protection against all insects. Since we have used this preparation and kept the legs of the bookcases in cans of petroleum, we have had no trouble with insects while books were on the shelves, but when left on laboratory desks, it has not been uncommon to have them much damaged in a night. White ants (anai) have never attacked the library, although they have been present in both buildings previously occupied by it.

The rapidity with which the library has grown during the year, the great number of business details that could only be attended to by one constantly handling the books, the large amount of correspondence necessary in arranging for exchanges, securing missing numbers of periodicals and books already ordered, and the lack of assistance have seriously retarded progress in classification and cataloguing. Accession books, one for current periodicals and one general accession book for all additions to the library, daily receipts record, shelf lists for all sets of periodicals on hand and for entomological publications, a business record of date ordered, requisition number, date received, date paid for, number of voucher on which payment is made and price for each title ordered or on hand, and an author and title index constitute the records at present available for consultation. It is hoped that additional assistance will enable this work to progress more rapidly during the coming year. A copy of the general accession book is given below (E) in which appear titles of all works in the library August 31, 1904, arranged according to date of payment. A bulletin containing a systematic arrangement of titles will be issued from the laboratory in the near future.

All bulletins published by the bureau of government laboratories are mailed from the library, which is also the depository for all publications available for distribution. The number of bulletins sent out from the laboratory may be seen from the list below (F).

The library has received a number of valuable gifts during the year, while the exchange list is constantly growing. A list of donors and gifts is appended to this report (G).

A.—List of current periodicals on file in library, bureau of government laboratories.

American Chemical Journal.
American Journal of the Medical Sciences.
American Journal of Physiology.
American Journal of Science.
American Medicine.
American Veterinary Review.
Anatomischer Anzeiger.

Anatomische Hefte.
Annalen der Physik.
Annales de Chimie et de Physique.
Annales de l'Institut Pasteur.
Annales de la Société entomologique de Belgique.
Annales de la Société entomologique de France.
Annales des sciences naturelles, Botanique.
Annales du Jardin botanique de Buitenzorg.
Annali d' Igiene sperimentale.
Annals of Botany.
Arbeiten aus dem kaiserlichen Gesundheitsamte.
Archiv der Pharmacie.
Archiv für Anatomie und Physiologie.
Archiv für Dermatologie und Syphilis.
Archiv für experimentelle Pathologie und Pharmakologie.
Archiv für Hygiene.
Archiv für klinische Chirurgie.
Archiv für mikroskopische Anatomie und Entwicklungsgeschichte.
Archiv für Schiffs- und Tropen-Hygiene.
Archiv für Verdauungskrankheiten.
Archiv für wissenschaftliche und praktische Tierheilkunde.
Archives d'Anatomie microscopique.
Archives de Biologie.
Archives générales de Médecine.
Archives Italiennes de Biologie.
Archives médicales de Toulouse.
Archives de Médecine expérimentale.
Archives de Parasitologie.
Archives des sciences biologiques (St. Petersburg).
Archivio per le scienze mediche.
Baumgarten's Jahresbericht.
Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie.
Berichte der deutschen botanischen Gesellschaft.
Berichte der deutschen chemischen Gesellschaft.
Berliner klinische Wochenschrift.
Berliner tierärztliche Wochenschrift.
Bibliographia Medica.
Biochemisches Centralblatt.
Biological Bulletin.
Biologisches Centralblatt.
Boston Medical and Surgical Journal.
Botanical Gazette.
Botanische Jahrbücher.
Botanische Zeitung, Parts I and II.
Botanisches Centralblatt.
British Journal of Dental Science.
British Medical Journal.
Bulletin de l'Académie de Médecine.
Bulletin de l'Herbier Boissier.
Bulletin de l'Institut Pasteur.
Bulletin de la Société chimique de Paris.
Bulletin de la Société entomologique de France.
Bulletin of the Johns Hopkins Hospital.
Bulletin of the Torrey Botanical Club.
Bullettino delle scienze mediche.
Canadian Entomologist.
Centralblatt für Agriculturchemie.
Centralblatt für allgemeine Pathologie.
Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, First Part, Originale and Referate, and Second Part.
Centralblatt für innere Medicin.
Centralblatt für die medicinischen Wissenschaften.
Chemical News.
Chemisches Centralblatt.
Chemische Industrie.
Comptes rendus . . . de l'Académie des Sciences.
Comptes rendus . . . de la Société de Biologie.

Correspondenz-Blatt für Zahnärzte.
Curtis's Botanical Magazine.
Dental Cosmos.
Dental Era.
Dental Review.
Deutsche medicinische Wochenschrift.
Deutsches Archiv für klinische Medicin.
Engineering and Mining Journal.
Entomological News.
Entomologische Zeitschrift.
Entomologisk Tidskrift.
Entomologist.
Entomologist's Monthly Magazine.
Ergebnisse der allgemeinen Pathologie (Lubarsch-Ostertag).
Flora.
Gazette des Hôpitaux.
Gazette médicale de Paris.
Gazette . . . des sciences médicales de Bordeaux.
Gazzetta chimica Italiana.
Gazzetta medica di Roma.
Genera Siphonagarum.
Giornale . . . veterinaria Italiana.
Hooker's Icones Plantarum.
Hoppe-Seyler's Zeitschrift für physiologische Chemie.
Hygienische Rundschau.
Index Kewensis.
Index Medicus.
India Rubber World.
Indian Lancet.
Indian Medical Gazette.
International Clinics.
International Dental Journal.
Items of Interest.
Jahrbuch der Chemie.
Jahresbericht der Pharmacie.
Jahresbericht über die Fortschritte der Agriculturchemie.
Jahresbericht über die Fortschritte der Chemie.
Jahresbericht über die Fortschritte der Physiologie.
Jahresbericht über die Fortschritte in der Lehre von den Gärungsorganismen.
Jahresbericht über die Fortschritte und Leistungen aus den Gebiete der Hygiene.
Jahresbericht über die Leistungen der chemischen Technologie.
Jahresbericht über die Leistungen und Fortschritte in der gesammten Medicin.
Johns Hopkins Hospital Reports.
Johns Hopkins University Circulars.
Journal de l'Anatomie et de la Physiologie.
Journal d'Hygiène.
Journal de Médecine de Paris.
Journal de Médecine vétérinaire et de Zootechnie.
Journal de Physiologie et de Pathologie générale.
Journal für Chemie und Physik.
Journal für praktische Chemie.
Journal of the American Chemical Society.
Journal of the American Medical Association.
Journal of Applied Microscopy and Laboratory Methods.
Journal of Botany, British and Foreign.
Journal of the Chemical Society.
Journal of Comparative Pathology and Therapeutics.
Journal of Cutaneous Diseases, including Syphilis.
Journal of Experimental Medicine.
Journal of Hygiene.
Journal of Infectious Diseases.
Journal of the Linnean Society, Botany.
Journal of Medical Research.
Journal of Pathology and Bacteriology.
Journal of the Royal Microscopical Society.
Journal of the Society of Chemical Industry.
Journal of Tropical Medicine.

Klininisches Jahrbuch.
Lancet.
Library Journal.
Liebig's Annalen der Chemie.
Medical Library and Historical Journal.
Medical News.
Medical Record.
Medical Review.
Medical Review of Reviews.
Mittheilungen aus der medicinischen Facultät der kaiserlich-Japanischen Universität zu Tokio.
Monatshefte für Chemie.
Monatshefte für praktische Dermatologie.
Montreal Medical Journal.
Münchener medicinische Wochenschrift.
Nature.
New York Medical Journal and Philadelphia Medical Journal.
Northwest Medicine.
Notizblatt des königl. botanischen Gartens und Museums zu Berlin.
Oesterreichische Chemiker-Zeitung.
Oesterreichische Monatsschrift für Tierheilkunde.
Pacific Dental Gazette.
Pennsylvania Medical Journal.
Pflanzenreich.
Philosophical Transactions of the Royal Society of London.
Photographic Times-Bulletin.
Photographische Mitteilungen.
Prager medicinische Wochenschrift.
Presse médicale.
Proceedings of the Royal Society.
Progrès dentaire.
Progrès médical.
Progressive Medicine.
Public Health Reports?
Public Libraries.
Quarterly Circular.
Quarterly Journal of Microscopical Science.
Recueil de médecine vétérinaire.
Recueil des travaux chimiques des Pays-Bas et de la Belgique.
Revue d'Entomologie.
Revue de Médecine.
Russkii Vratch.
Sammlung chemischer und chemisch-technischer Vorträge.
Schmidt's Jahrbücher.
Science.
Semaine médicale.
Sperimentale.
St. Louis and Canadian Photographer.
St. Petersburger medicinische Wochenschrift.
Stettiner entomologische Zeitung.
Stomatologiai Közlöny.
Therapeutic Gazette.
Tierärztliche Zentralblatt.
Transactions of the American Entomological Society.
Transactions of the American Microscopical Society.
Transactions of the Entomological Society of London.
University of Pennsylvania Bulletins.
Virchow's Archiv.
Wiener entomologische Zeitung.
Wiener klinische Wochenschrift.
Wiener medicinische Wochenschrift.
Zeitschrift für analytische Chemie.
Zeitschrift für angewandte Chemie.
Zeitschrift für angewandte Mikroskopie.
Zeitschrift für anorganische Chemie.
Zeitschrift für Biologie.
Zeitschrift für Hygiene und Infectionskrankheiten.

Zeitschrift für Instrumentenkunde.
Zeitschrift für klinische Medicin.
Zeitschrift für öffentliche Chemie.
Zeitschrift für Pflanzenkrankheiten.
Zeitschrift für physikalische Chemie.
Zeitschrift für Thiermedicin.
Zeitschrift für Untersuchung der Nahrungs- und Genussmittel.
Zeitschrift für Veterinärkunde.
Zeitschrift für wissenschaftliche Mikroskopie und für mikroskopische Teknik.
Zeitschrift für wissenschaftliche Zoologie.
Zentralblatt für Gynäkologie.
Zoologischer Anzeiger.

B.—*List of publications ordered, but not as yet on hand.*

SETS OF PERIODICALS.

Annales de Chimie et de Physique, to vol. 22, 7th series.
Annales de la Société entomologique de Belgique, to 1903.
Annales de la Société entomologique de France, to 1903.
Annali d' Igiene sperimentale, to 1901.
Arbeiten aus dem kaiserlichen Gesundheitsamte, to 1903.
Arbeiten des botanischen Institut in Würzburg, 1874–1888.
Arbeiten des pharmakologischen Institut zu Dorpat, to 1902.
Archiv der Pharmacie, to 1901.
Archiv für Anatomie und Physiologie, 1825-1832.
Archiv für Dermatologie und Syphilis, to 1904.
Archiv für experimentelle Pathologie und Pharmakologie, to 1903.
Archiv für Hygiene, to vol. 42.
Archiv für klinische Chirurgie (Langenbeck's Archiv), vols. 1–71.
Archiv für mikroskopische Anatomie und Entwicklungsgeschichte, vols. 1–57.
Archiv für Verdauungskrankheiten, to 1903.
Archives d'Anatomie microscopique, to 1903.
Archivio per le scienze mediche, to 1901.
Arkiv för Botanik, to 1904.
Berichte aus dem physiologischen Laboratorium und Versuchungsanstalt der landwirthschaftlichen Institut zu Halle, to 1903.
Berichte der deutschen-botanischen Gesellschaft, to 1904?
Berichte der schweizerischen botanischen Gesellschaft, 1891–1901.
Berliner und deutsche entomologische Zeitschrift, 1857–1880.
Berliner entomologische Zeitschrift, to 1905.
Berliner tierärztliche Wochenschrift, 1893–1902.
Botanisches Centralblatt, Beihefte, complete.
Botanische Mitteilungen aus der Tropen, to 1901, all published.
Bulletin de la Soci´té entomologique de France, to 1903.
Bulletin of the British Ornithologist's Club, 1895-1903.
Centralblatt für Nahrungs- und Genussmittel, Chemie, complete.
Centralblatt für Agriculturchemie, to 1903.
Chemische Industrie, to 1901.
Comptes rendus . . . Société de Biologie, to 1901.
Deutsche medicinische Wochenschrift, to 1901.
Historische Studien aus dem pharmakologischen Institut zu Dorpat, to 1903.
Hooker's Journal of Botany and Kew Garden Miscellany, 1849–1857.
Hygienische Rundschau, to 1903.
Ibis, 1895-1903.
India Rubber World, 1901–1902.
Indian Medical Gazette, to 1903.
Jahresbericht der Pharmacie, vols. 1–58.
Jahresbericht über die Leistungen der chemischen Technologie, to 1903.
Journal, allgemeines, der Chemie, 1798–1802 (Scherer).
Journal de médecine vétérinaire, present series to 1903.
Journal, neues, für Chemie, 1803-1805 (V. Gehlen).
Journal, neues, für Chemie, Physik und Mineralogie, 1807–1809.
Journal of Applied Microscopy and Laboratory Methods, vols. 1–5.
Journal of the Asiatic Society of Bengal, Natural History series, 1865–1903.
Journal of Botany, British and Foreign, 1863–1903.
Journal of Comparative Pathology and Therapeutics, vols. 1–15.

Journal of Medical Research, vols. 1–5.
Journal of Tropical Medicine, vols. 1–4.
Just's Botanischer Jahresbericht, 1874–1903.
London Journal of Botany, 1842–1848.
Memoirs from the Biological Laboratory of the Johns Hopkins University, vols. 1–3.
Mittheilungen aus der medicinischen Facultät der kaiserlich-Japanischen Universität zu Tokio, vols. 1–5.
Münchener medicinische Wochenschrift, to 1901.
Nature, to 1901.
Petites nouvelles entomologiques, 1869–1879.
Philadelphia Medical Journal, vols. 1–8.
Prager medicinische Wochenschrift, to 1901.
Quarterly Journal of Cryptogemic Botany, 1872–1894.
Repertorium der analytischen Chemie, to 1887.
Semaine médicale, to 1903.
Sitzungsberichte aus der k. k. Akad. der Wissenschaften zu Wien, mathematisch-naturwiss. Klasse, to 1904.
St. Louis and Canadian Photographer, 1902.
Studies from the Department of Pathology of the College of Physicians and Surgeons, Columbia University, complete.
Thompson-Yates Laboratory Reports and Memoirs of the Liverpool School of Tropical Medicine, complete.
Transactions of the American Microscopical Society, 1903.
Transactions of the Linnean Society, Second series, Botany, all published.
University of Pennsylvania Bulletins, to 1903.
Wiener medicinische Wochenschrift, vols. 1–52.
Zeitschrift für angewandte Mikroskopie, to 1901.
Zeitschrift für Nahrungsmittel-Untersuchung, Hygiene und Waarenkunde, to 1903.
Zeitschrift für öffentliche Chemie, to 1901.
Zeitschrift für Pflanzenkrankheiten, to 1903.
Zentralblatt für Gynäkologie, to 1903.

Sets of periodicals	76
Yearly subscriptions	20
Botanical publications	64
Entomological publications	74
Works on chemistry and allied sciences	23
Works on pathology, bacteriology, medicine, etc.	18
Works on photography	2
Total	277

D.—*Formula for varnish.*

Shellac (pure white)	grams.	50
Resin	do.	20
Bichloride of mercury	do.	1
Alcohol	c. c.	1,000

Mix thoroughly, leave for 24 hours, then filter.

F.—*Bulletins mailed from bureau of government laboratories.*

	Number.
No. 1. 1902. Biological Laboratory: Preliminary Report of the Appearance in the Philippine Islands of a Disease Clinically Resembling Glanders. By R. P. Strong, M. D. (Reprint, 1904)	1,043
No. 2. 1902. Chemical Laboratory: The Preparation of Benzoyl-Acetyl Peroxide and its Use as an Intestinal Antiseptic in Cholera and Dysentery. Preliminary Notes. By Paul C. Freer, M. D., Ph. D. (Reprint, 1904)	1,060
No. 3. 1903. Biological Laboratory: A Preliminary Report on Trypanosomiasis of Horses in the Philippine Islands. By W. E. Musgrave, M. D., acting director biological laboratory, and Norman E. Williamson, assistant bacteriologist, bureau of government laboratories. (Out of print)	1,000
No. 3. Spanish edition	884
No. 4. 1903. Serum Laboratory: Preliminary Report on the Study of Rinderpest of Cattle and Carabaos in the Philippine Islands. By James W. Jobling, M. D., director of the serum laboratory	1,836
No. 4. Spanish edition	2,000

	Number.
No. 5. 1903. Biological Laboratory: Trypanosoma and Trypanosomiasis, with Special Reference to Surra in the Philippine Islands. By W. E. Musgrave, M. D., acting director biological laboratory, and Moses T. Clegg, assistant bacteriologist, biological laboratory	1,661
No. 6. 1903. I—New or Noteworthy Philippine Plants. II—The American Element in the Philippine Flora. By Elmer D. Merrill, botanist. (Issued January 20, 1904)	1,344
No. 7. 1903. Chemical Laboratory: The Gutta-Percha and Rubber of the Philippine Islands. By Penoyer L. Sherman, jr., Ph. D., chemist, chemical laboratory	951
No. 8. 1903. A Dictionary of the Plant Names of the Philippine Islands. By Elmer D. Merrill, botanist	929
No. 9. 1903. Biological Laboratory: A Report on Hemorrhagic Septicæmia in Animals in the Philippine Islands. By Paul G. Woolley, M. D., and James W. Jobling, M. D.	1,343
No. 10. 1903. Biological Laboratory: Two Cases of a Peculiar Form of Hand Infection (Due to an Organism Resembling the Koch-Weeks Bacillus) By John R. McGill, M. D., and Wm. B. Wherry, M. D.	1,000
No. 11. 1903. Biological Laboratory: Entomological Division, Bulletin No. 1, Preliminary Bulletin on Insects of the Cacao. (Prepared especially for the benefit of farmers.) By Charles S. Banks, entomologist, bureau government laboratories	1,000
No. 12. 1903. Biological Laboratory: Report on Some Pulmonary Lesions Produced by the Bacillus of Hemorrhagic Septicæmia of Carabaos. By Paul G. Woolley, M. D.	925
No. 13. 1904. Biological Laboratory: A Fatal Infection by a Hitherto Undescribed Chromogenic Bacterium: Bacillus aureus fœtidus. By Maximilian Herzog, M. D.	1,186
No. 14. Serum Laboratory: Texas Fever in the Philippine Islands and the Far East. By James W. Jobling, M. D., and Paul G. Woolley, M. D. Biological Laboratory: Entomological Division, Bulletin No. 2, The Australian Tick (Boophilus australis Fuller) in the Philippine Islands. By Charles S. Banks, entomologist	1,131
No. 15. 1904. Biological and Serum Laboratories: Report on Bacillus violaceous Manilæ: A Pathogenic Microörganism. By Paul G. Woolley	821
No. 16. 1904. Biological Laboratory: Protective Inoculation against Asiatic Cholera: An Experimental Study. By Richard P. Strong, M. D. (In press. Edition of 1,500.)	
No. 17. 1904. New or Noteworthy Philippine Plants. By Elmer D. Merrill, botanist. (In press. Edition of 1,500.)	
No. 18. 1904. Biological Laboratory: I—Amebas; their Cultivation and Etiologic Significance. By W. E. Musgrave, M. D., and Moses T. Clegg. II—The Treatment of Intestinal Amebiasis (Amebic Dysentery) in the Tropics. By W. E. Musgrave, M. D. (In press. Edition of 2,000.)	
No. 19. 1904. Biological Laboratory: Some Observations on the Biology of the Cholera Spirillum. By W. B. Wherry, M. D. (In press. Edition of 2,000.)	
No. 20. 1904. Review of the Identifications of the Species of Blanco's Flora de Filipinas. By Elmer D. Merrill, botanist. (In press. Edition of 2,000.)	
Total number bulletins printed and in press	33,500
Total number bulletins distributed	20,114
Available for distribution	13,386

G.—*List of persons and institutions making donations to library of the bureau of government laboratories, during the year ended August 31, 1904.*

Dr. David Prain, director Royal Botanic Garden, Calcutta. (Annals of the Royal Botanic Garden, complete.)
Dr. William Trelease, director Missouri Botanical Garden. (Reports of Missouri Botanical Garden, complete.)
Dr. J. C. Willis, director Royal Botanic Garden, Ceylon. (Bulletins.)
Dr. M. Treub, director's Lands Plantentuin, Buitenzorg, Java. (Bulletins and reports.)
Dr. H. N. Ridley, director Royal Botanic Garden, Straits Settlements. (Bulletins and reports.)
Director New York Botanical Gardens. (Bulletins.)

Director Botanic Garden, New South Wales. (Report.)
H. B. M., consul-general for the Philippine Islands and the sanitary commissioner with the government of India. (Report of the Indian Plague Commission, vols. 1–5, 1898-1899.)
Prof. Dr. S. Kitasato, director Institute of the Imperial Government of Japan. (Report 1896–1903 and bulletins.)
Dr. C. W. Daniels, director Institute for Medical Research, Federated Malay States. (Bulletins.)
Government, Cape of Good Hope. (Rinderpest bulletins and Agricultural Journal.)
Egyptian Government. (Bulletins.)
Hawaii, board of commissioner of agriculture and forestry. (Bulletins.)
Jamaica, department of agriculture. (Bulletins.)
Koloniaal Museum te Haarlem. (Bulletins.)
Royal Asiatic Society, Straits Branch. (Journal.)
Government veterinary surgeon, Singapore. (Report.)
Academia Nacional de Medicina de Lima. (Bulletin.)
Health department of government of Cuba. (Bulletins.)
Surgeon-General's Library. (Transactions of the National Dental Association, 1860–1899 Transactions of the Southern Dental Association, 1897; Transactions of the American Dental Association, 1894.)
Dr. Louis Ottofy. (Transactions of the Illinois State Dental Society, 1890–1900; Annual Report of the Illinois State Board of Dental Examiners, 1894; Constitution and By Laws of the Chicago Dental Society.)
Messrs. P. Blackiston's Son & Co. (in response to request made by Dr. Louis Ottofy through the honorable the secretary of the interior, Manila, P. I.). (Dental and medical books as follows: Bromell—Anatomy and Histology of the Mouth and Teeth; Gorgas—Dental Medicine; Gorgas—Harris's Principles and Practice of Dentistry; Tomes—Dental Anatomy; Warren—Dental Pathology and Medicine; Bartley—Medical Chemistry; Gould—Illustrated Dictionary of Medicine; Gould and Pyle—Cyclopedia of Medicine and Surgery; Kirkes—Handbook of Physiology; Morris—Human Anatomy Montgomery—Text-book of Gynecology; Stohr—Text-book of Histology; Tyson—Practice of Medicine; Walsham—Surgery, its Theory and Practice; Williams—Manual of Bacteriology.)
Publishers of the following dental journals (sent in response to request made by Dr, Louis Ottofy through the honorable the secretary of the interior, Manila, P. I.): Quarterly Circular; British Journal of Dental Science; Correspondenz-Blatt für Zahnärzte Dental Cosmos; Dental Era; International Dental Journal; Items of Interest; Denta Review; Pacific Dental Gazette; Le Progrès dentaire; Stomatologaai Közlöny.
Dr. Paul C. Freer, superintendent of government laboratories, Manila. (Subscription to Science for 1904.)
Dr. Louis Ottofy. (Outlines of Dental Pathology.)
Doctors Freer and Novy. (On the Organic Peroxides Reprinted from Contributions to Medical Research, dedicated to Victor Clarence Vaughan by colleagues and former students of the department of medicine and surgery of the University of Michigan June, 1903.)
Doctors Novy and McNeal. (On the Cultivation of Trypanosoma brucei. Reprinted from the Journal of Infectious Diseases, vol. 1, No. 1, Jan. 2, 1904, pp. 1–30.)
Dr. Louis Ottofy. (Tropical Influence on the Diseases of the Oral and Dental Tissues Reprinted from Dental Cosmos, December, 1903.)
Dr. Edwin O. Jordan. (The Self Purification of Streams. Reprinted from Decennial Publications, University of Chicago, vol. 10.—The Field of Municipal Hygiene. Reprinted from Popular Science Monthly, June, 1903.—The Connection between the Alkalinity of Certain Bacterial Filtrates and their Hemolytic Power. Reprinted from the Journal of Medical Research, vol. 10, No. 1.)
Dr. G. Bernard Smith. (Two Cases of Paratyphoid Infection; One Caused by an Aberrant Organism. Reprinted from the Journal of the American Medical Association, Dec. 12 1903.)
Dr. C. Pulfrich. (A New Form of Refractometer. Reprinted from The Astrophysical Journal, vol. 3, No. 4, April, 1896.)
Dr. Lanncelot W. Andrews. (On a New Method for the Preparation of Pure Iodine; Science in its Relation to the Ethical Sentiments.)
Dr. E. H. Ruediger. (Bacteriologic Study of the Blood in Thirty Cases of Clinical Typhoid Fever; The Production and Nature of Streptocolysin.)
Dr. Herbert E. Durham. (Some Notes on the Urine in Beriberi; Notes on Beriberi in the Malay Peninsular and on Christmas Island, Indian Ocean.
Dr. Israel C. Russell. (Research in State Universities.)

Dr. Hideyo Noguchi. (The Effects of Venom upon the Blood Corpuscles of Cold-Blooded Animals.)
Doctors Heckel, de Cordmay and Schlagenhauffen. (Sur un nouveau Copal et sur un nouveau Kino Fournis le premier par le Fruit et le second par l'Ecorce du Dipteryx odorata Willd.)
Dr. Ludvig Hektoen. (Linneas as a Physician; The Action of Certain Irons upon the Lysins in Human Serum; Recent Investigations bearing on Infectious Diseases of Unknown Etiology; Note on Typhoid Fever and Scarlet Fever with Special Reference to the Diagnostic Value of Blood Cultures.)
Dr. George H. Weaver. (Bacteriologic Studies of the Skin and Throat in Cases of Scarlatina; Vitality of Bacteria from the Throats of Scarlet Fever Patients; Cirrhosis of the Liver of the Guinea-Pig produced by a Bacterium (Bacillus coli communis) and its Products.)
Dr. J. W. Jenks. (Report on English and Dutch Colonies in the Orient.)
Carnegie Institution. (Desert Botanical Laboratory of the Carnegie Institution, Coville and MacDougal.)
Mr. Elmer D. Merrill. (El Roble (Quercus jordanæ) de la Flora de Filipinas, 1875.)
Dr. W. E. Musgrave. (Subscription to Northwest Medicine for 1904.)
Publishers of Schimmel's Semiannual Reports. (Reports for years 1896–1902, inclusive.)
United States Government Departments as follows: Department of Agriculture—Bureau of Animal Industry, Bureau of Plant Industry, etc.; War Department—Bureau of Insular Affairs, Office of Surgeon-General, U. S. A., General Staff, U. S. A., Philippines Division (maps); Coast and Geodetic Survey (maps and charts); Treasury Department—Laboratory, P. H. and M. H. S.; Census Bureau; National Herbarium; National Museum, etc.
Departments of the Government for the Philippine Archipelago. (Reports and bulletins.)
Presidents of most important American Universities. (Registers and announcements.)
Directors of agricultural experiment stations as follows: Alabama, Arizona, Arkansas, California, Cornell University, Florida, Hatch, Illinois, Indiana, Kansas, Michigan, Mississippi, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Pennsylvania, Rhode Island, Storrs, South Dakota, Tennessee, Texas, Vermont, Virginia, Wisconsin, Wyoming, West Virginia.

REPORT OF DR. RICHARD P. STRONG, DIRECTOR OF THE BIOLOGICAL LABORATORY.

In the following report only a brief summary of the work performed during the past year has been attempted. During that time the scope of the laboratory has been widened and the various divisions more thoroughly organized.

CLINICAL LABORATORY EXAMINATIONS.

This division of the work has been under the direction of Dr. W. E. Musgrave. It is regarded as the most important section of the routine work of the laboratory; as during the previous year, all the clinical laboratory examinations necessary for the civil hospital, the San Lazaro Hospital, Bilibid prison and the board of health have been performed, and in addition a number of examinations have been undertaken for private physicians. The number, nature, and results of the examinations are shown in the following tables. There has been a steady augmentation in the amount of clinical diagnostic work carried on by the laboratory during the past two years, increasing from 3,816 analyses in 1902 to 6,535 in 1903, and finally to 30,830 in 1904. When one considers that this averages about 103 examinations for each working day of the year, it can be readily understood how much of the time of the laboratory force is occupied with this routine work. Attention has been called in previous reports to the great importance of these examinations and of the impracticability, particularly in tropical countries, of the physician making correct diagnoses and thus properly treating his cases without laboratory aid. In this connection, it seems advisable to call attention to the amount of clinical laboratory work performed for private physicians, for only in this has there been, during the past year, a decrease in the number of examinations requested. The reason is very obvious, for at the government laboratories a charge is made for each private examination, and many physicians have apparently either preferred to go to other laboratories in the city, where the work may be performed for a smaller sum, or where no charge is made; or, indeed, even to be content without laboratory examinations for their patients. Such a condition of affairs seems unfortunate, since it is believed that the public would be more benefited if practicing physicians made greater use of the government laboratory in assisting them in the diagnosis of certain diseases. Therefore it would

seem advisable, at least for a time, to abolish this charge for clinical laboratory examinations for physicians.

During the year a number of cases of leprosy in which the lesions of the disease were not sufficiently definite for a diagnosis to be made, or in two cases even suspected, have been detected with certainty by bacteriological examinations.

PATHOLOGICAL WORK.

This section of the work has been placed under the direction of Dr. M. Herzog since February, 1904. It includes the examination of all tissues for tuberculosis, leprosy, syphilis, etc., or of tumors or other pathological specimens sent to the laboratory for diagnosis.

The amount of this work performed for the various government institutions is gradually increasing. An interesting fact in connection with these examinations may be mentioned, that of a total of 13 appendixes removed and sent to the laboratory for examination for amœbæ only one was found to contain these parasites. During the year there have been 271 autopsies performed (an increase of 71 over the previous one) for the board of health, the civil hospital, and Bilibid prison. In Table V the necropsies are classified. Records are kept of all the autopsies performed, which, apart from their statistical value, have proved of great importance to the government in several medico-legal cases. These post-mortem examinations have also been of considerable assistance to the board of health in their endeavor to control infectious diseases, such as plague and Asiatic cholera, since many persons who have succumbed to them and who have not been seen by a competent physician during life are found dead in their houses, and in such cases a diagnosis is frequently impossible without an autopsy. Bacteriological examinations are made in cases of death from infectious diseases.

The pathological museum is gradually increasing in size and value. At present 325 specimens, illustrating various lesions of tropical diseases, are on hand. The preparations, as a rule, have been preserved in Kaiserling's solution. Apparently much greater care in protection from light is necessary in the Tropics than in temperate climates in order to prevent the fading of colors in specimens preserved in this liquid. The task of preserving and caring for the museum specimens has been given to Mr. F. H. Willyoung, who, in addition, has performed almost the entire histological work of the laboratory. There has been a great increase in the latter during the year; nearly 3,000 sections have been cut, mounted, and stained. Almost all of the embedding is done in paraffin, celloidin being used only occasionally in certain diagnostic work. In the Tropics one can not rely upon small, spray-freezing machines for quick sectioning, since their use is frequently impracticable because of the knife temperature. The large carbon-dioxide tubes are necessary, but sections obtained here by freezing in this manner are often unsatisfactory, and, indeed, the members of the laboratory have practically given up the use of frozen sections. It is probable that we may be able to conduct this class of work more satisfactorily when the cold-storage rooms are completed.

Considerable difficulty is experienced in dehydrating sections, because of the great humidity during certain seasons of the year, and at times it is practically impossible thoroughly to accomplish the desired result, for the sections immediately take up moisture from the air. It has also been noticed that stained sections (protected from light) show a tendency quickly to fade in Manila, and a similar complaint has come to me from Doctor Bell, of the bacteriological laboratory in Hongkong. It has been supposed that this was due to an acid reaction of the Canada balsam which the high temperature, combined with moisture, produces. I recently examined the reaction of specimens of balsam on each desk in the biological laboratory and in every instance obtained a marked acid reaction. In sections stained with methylene blue and eosin the trouble may be due to improper dehydration. In the short time required in mounting, the sections after thorough dehydration, will sometimes absorb enough mosture from the air to dissolve out the methylene blue.

HYGIENIC WORK.

The work in this section has included numerous bacteriological analyses of drinking waters, both from the city supply and from other parts of the archipelago; the examination of waters from various mineral springs; of bottled commercial waters offered for sale; of bottled lemonade, etc.; of well waters suspected of contamination by the board of health, etc., and in addition many bacteriological analyses of milk have been made. The work in this division, besides miscellaneous examinations, has included the study of various disinfectants and the examination of rats for infection with bacillus pestis, etc.

The bacteriological analyses of the city water supply have been carefully carried on since December, 1903. The results are tabulated in Table VI. They have been performed almost entirely by Mr. Moses T. Clegg, assistant bacteriologist. In my annual reports of the years 1902 and 1903 I discussed the question of the city water supply and pointed out the danger

of using this water for drinking purposes unless it was thoroughly boiled and filtered. Attention was called to the fact that sarkodina (amœbæ) and mastigophora were present in this water, and in 1902 I pointed out that in the examination of the city water supply "amœbæ and several varieties of sarkodina were frequently cultivated in large numbers. Amœbæ were grown in about one or two out of every four or five examinations." During the past year, Dr. W. E. Musgrave, pathologist of this laboratory, has confirmed these results and has prepared a special medium in which amœbæ in symbiosis with bacteria may be more easily cultivated. He has made numerous analyses of samples taken from the water supply throughout its entire length, with the view of determining the presence or absence of these micro-organisms, and he has found that they may be cultivated from water secured at all points along the Mariquina River. While the existence of these micro-organisms in the supply of the city of Manila was pointed out in 1902, the evidence of their pathogenisity was not at that time demonstrated. During the past year Doctor Musgrave has carried on extensive experiments by feeding encysted forms of amœbæ cultivated from the city water supply and has shown that at least one variety of these sarkodina are pathogenic, since after feeding to monkeys the encysted cultures grow in symbiosis with saphrophytic bacteria for prolonged periods of time. Infection and amœbic enteritis was produced in a certain proportion of the animals. In order to obtain a correct idea of his work, which is too lengthy to be considered in detail here, one should peruse his valuable article prepared with Mr. Moses T. Clegg on this subject, entitled "Amebas, their Cultivation and Etiologic Significance," and which will shortly appear as Bulletin No. 18, bureau of government laboratories. If one needed an additional warning in regard to the danger of contracting amœbic dysentery from the use of the city water supply for drinking purposes, it would seem that Musgrave's experiments would certainly supply it.

On March 2, 1904, I was informed by the superintendent of government laboratories that an expedition, consisting of the city engineer and his assistants, would go to the source of the Mariquina River above Montalbon for the purpose of an inspection of the source of the proposed new city supply, and in order to secure a bacteriological examination, Doctor Musgrave was requested to accompany the party and collect specimens of water at the source and at intervals along the water supply,[a] and to perform the necessary bacteriological analyses. I quote from Doctor Musgrave's report of this trip as follows:

"Samples of water for culture for both bacteria and protozoa were taken just below the junction of the two streams which form the Mariquina River; at the site of the new dam; at Montalban, San Mateo, and Santolan. * * * The sample for colony counts taken at the head of the river was unfortunately contaminated; for the others the numbers of bacteria per cubic centimeter were as follows:

From the site of the new reservoir	208
From the river just below Montalban	377
From the river just below San Mateo	105
From the present intake at Santolan	267
From the tap in city	194

"These counts were carefully made from a large number of plates and represent quite accurately the bacteria in the samples taken. I can not satisfactorily explain the low count in the sample from San Mateo. Some growth may have occurred during the twelve to eighteen hours between the time the samples were taken and the time plates were made, notwithstanding they were kept packed on ice during this time. No classification of the bacteria has been attempted. They are for the most part very free-growing organisms and a considerable number are pigment producers. One of these latter, which has been found in all the plates, is a large yellow pigment-producing bacillus, not pathogenic for laboratory animals, but which has been found a most uniformly satisfactory symbiotic organism for the cultivation of amœbas in artificial media. Cultures for amœbas made from the same places as the bacteria (already mentioned) and in addition, one from the head of the Mariquina River, all showed numerous amœbas after the usual length of time, and some of these protozoa are now being further worked out. I know of no satisfactory method of determining actual numbers of amœbas as in the case of bacteria, but they are apparently quite numerous throughout the water course. From a sanitary standpoint there can be no question of doubt about the advisability of changing the source of the water supply, and the judgment shown in the selection of the proposed new site is equally apparent. * * * The proposed new site for the water supply is free from many of the objections to the present one, and is, on the whole, probably as satisfactory a location as could be found within a reasonable distance of Manila. The valley is narrow and the mountains high and steep on both sides. There are but few animals and very little human traffic in the region. There is, however, considerable vegetation and a small town, Bosoboso, is situated on one branch, a few miles

[a] Mr. Thanisch, of the chemical laboratory, was also present and secured samples for chemical analysis.

above the proposed reservoir. As much as possible of the vegetation, and all animal life should be removed from the entire water shed to bring the city supply within the bounds of probable safety. With ordinary precautions the danger from bacteria in a water supply obtained from the proposed location would probably be very remote. In furnishing a safe supply to Manila, however, another factor as important as the bacteria should be considered. Amœbas play an important rôle in the invalidism of the city's population, and it has recently been shown in the laboratory that some of the pathogenic amœbas are found in the present water supply. I do not affirm that all amœbas are pathogenic, but at the present time no practical means are known by which the pathogenic ones may be separated. The only safe sanitary deduction is, therefore, to regard them all as dangerous. It has already been shown in this report that the water above the new proposed reservoir contains these parasites, and they must therefore enter into our consideration. To limit the danger from amœbas in the supply, one or both of two methods suggest themselves. First, limit the number of amœbas and bacteria in the reservoir by removing all possible organic matter from the watershed; second, accomplish the same result or reenforce the first by a method of filtration. Recent unpublished work in this laboratory by Mr. Clegg and myself has shown that within certain limits amœbas are adaptable; and that this varying degree of pathogenicity is influenced by the environment of the protozoa. It is apparently increased by passage through the animal organism and it is likely also to be influenced by the class of bacteria and other substances with which it may be associated. This work has progressed far enough to indicate that the farther and longer they are removed from animal organic matter and possibly from some bacteria quite common in man, the less will be the likelihood of the amœbas being pathogenic to human beings on direct inoculation. This statement is offered as an additional reason for a complete removal of animal life from the proposed new watershed. * * * In closing, I wish to emphasize that provisions for a safe water supply for Manila must include methods for removal of animal parasites which are present in the Mariquina River and its tributaries."

The city engineer having recognized that it would be of importance to carry on experiments with the idea of excluding amœbea from the water supply by a system of filtration, prepared some experimental filters. So far they have shown themselves entirely inadequate to remove these microorganisms from the water. I personally believe that it is impractiable to free the general water supply of these sarkodina, and however interesting experiments with this end in view may seem, I do not believe that the city water here can be purified by general filtration so that it will be advisable for Americans or Europeans to drink it, unless it has been sterilized in some way. It is far wiser for us, at least for the present, to direct our efforts toward convincing the people that the unsterilized water is unsafe for drinking purposes.

Since a great number of the American and European inhabitants have become so afraid of using the city water either as it flows from the tap or after it has been boiled for drinking purposes, on account of the danger of its becoming again infected, many individuals have entirely abandoned its use and have instituted bottled waters. A number of these have been submitted to the laboratory for bacteriological diagnosis, either by the companies promoting their sale or by the board of health. As a result of these analyses some have been condemned as unfit for use.

In the hygienic section of the laboratory the examination of rats, submitted by the board of health, for infection with *Bacillus pestis* has been performed. This work has been carried on by Mr. Charles B. Hare. During the present year no rat has been found infected with this organism. In a few cases bacilli resembling morphologically those of plague were found present, but a further examination by culture and animal inoculation showed them to be other organisms. During the previous year the percentage of rats found infected with *Bacillus pestis* was one-sixteenth of 1 per cent.

ANIMAL DISEASES.

The large importation of cattle made by the government for the purpose of restocking the islands with draft animals, has necessitated the frequent examination of these animals for various diseases which were either present in the animal or which developed later among them. About 9,000 blood examinations of carabaos for surra have been performed during the year, of which 1,000 were positive. The total number of examinations for trypanosomiasis during the year was 9,569, of which 1,123 contained the organism. The importance of immediate examination of all imported carabaos will be recognized when the fact is considered that on one occasion an animal suffering with trypanosomiasis was discovered on the lighter conveying the animals from the ship to the shore; it could only have contracted the disease in China.

Among other diseases existing in Manila that have been brought to light among animals during the year, are a number of cases of Texas fever. These cases have been studied and report of them made by Dr. J. W. Jobling, formerly director of the serum laboratory, and

Dr. P. G. Woolley, at that time pathologist in this laboratory. (See Bulletin No. 14, bureau of government laboratories.) A number of the imported cattle died after arriving in these islands, and many autopsies were performed in order to determine the cause of death. Hemorrhagic septicæmia seemed to be a common disease among the animals at first imported. The investigation of these animal diseases in and about the city of Manila, so far as they were studied in the biological laboratory, were carried on chiefly by Dr. P. G. Woolley, who was transferred to the serum laboratory in February, 1904. However, the laboratory has in addition on a number of occasions, when requested, sent members of its staff to other portions of the archipelago for the proper investigation of epidemic diseases of animals. Thus, in January, 1904, Mr. F. H. Willyoung was directed by the superintendent to proceed to Bacolod, Occidental Negros, for the purpose of determining the number of diseased animals among the government carabaos at that place in herds known to be infected with surra. He found that of 2,092 examinations repeated on the same animals 257 were positive.

In October, 1903, upon the repeated and urgent requests of Mr. Roxas for aid in relation to a disease which was rapidly destroying the live stock on his estate in Masuhbu, Dr. W. E. Musgrave and Mr. F. H. Willyoung were requested to visit this place and investigate. They found that many of the carabaos had been affected with rinderpest, and that of 320 of these animals, 140 had died of this disease. Out of 66 native ponies 14 had died of surra, and a number of other horses were suffering from *pseudo farcy*.

In May of this year Drs. M. Herzog and W. B. Wherry were requested to make recommendations in regard to the disposition of some government carabaos suffering with surra at Malolos. In this connection Doctor Herzog made some interesting observations to the effect that in 43 carabaos, which represented the remnants of a herd of 100, 6 of these 43 (of which the remaining individuals were infected with surra) never contracted the disease, as shown by numerous and repeated blood examinations, extended over a period of about six months. These observations suggested the possibility of a natural immunity for certain carabaos against the disease. On the other hand, a number of animals had been infected for several months with trypanosoma, and in spite of this fact they were in a fair physical condition, and able to perform the work of healthy carabaos.[a]

A number of bacteriological examinations for glanders in horses which had responded to the mallein test have been performed during the year for the United States Army, and a number of examinations of horses for pseudo farcy (blastomycetic) infection have also been carried on. A few carcasses of pigs which had died of hog cholera have been received at the laboratory for diagnosis during the year.

ENTOMOLOGICAL.

The entomological work has been carried on by Mr. Charles S. Banks, entomologist, and Mr. W. Schultze.

After his study of insects of the cacao, Mr. Banks occupied himself chiefly with the arrangement and preparation of the entomologic exhibit for the St. Louis Exposition.

At the time of the discovery of cases of Texas fever in cattle in Manila, Mr. Banks was requested by the superintendent to examine these animals for ticks, which he did, and obtained a number of specimens which he identified as *Boophiluis australis* (Fuller), the Australian cattle tick capable of transmitting Texas fever. He has given a careful description of these ticks, with numerous illustrations, in Bulletin No. 14, biological laboratory, bureau of government laboratories.

After his departure with the laboratory entomologic exhibit for the St. Louis Exposition, in January, the entomological work was carried on by Mr. Schultze, who has prepared for me the following brief summary of the year's work in this department:

"A large number of insects (about 1,500), which were previously preserved in alcohol, have been permanently pinned, mounted, and arranged. These specimens include *Coleoptera*, *Hemiptera*, *Lepidoptera*, etc. Most of the insects of the collection have been classified and a card-catalogue system has been introduced, containing the usual information in regard to date of collection, place where found, etc.

"Insects (15 different species), particularly *Lepidoptera*, have been bred with a view of studying their life history. Some interesting observations and experiments with *Attacus atlas* in parthenogenesis have been made. Drawings of about 30 insects intended for future publications have been completed, and quite a number of new species have been either partly or completely described. Special attention has been paid to economic entomology throughout the year.

"During the week of October 16 to 23, 1903, an expedition was made into the province of Laguna to study and collect insects damaging the cocoanut tree. A second one into the province of Laguna, for the same purpose, was undertaken between July 26 and August 1,

[a] See the report of the director of the serum laboratory in respect to surra in the Negros herd.—Freer.

1904. Three distinct species were found infesting the cocoanut trees in Pasayan and in Magdalena, and several new ones were also discovered which were evidently doing great injury to these trees. A study has been made of the habits and life character of these insects. During this trip specimens of an insect injurious to the cotton tree were also obtained. This individual belongs to the *Cerambycidæ* family. Samples of cotton and cocoanut trees showing the results of the destruction were obtained for the laboratory collection.

"Upon the suggestion of the laboratory there has been taken up the collection and study of *Culicidæ*, and some new species have been discovered which will shortly be fully described In connection with the investigation of the rôle that insects play as plague carriers, a new species of rat flee has been encountered.

"There are now on hand in the entomological section over 3,300 different insects of both classes, arranged and classified in permanent boxes. Of these a very large number (several hundred) are new and hitherto undescribed species. Two thousand of the specimens are *Coleoptera*, and the remaining number comprise the other classes. The material still contained in alcohol and not yet classified and arranged consists of from 7,000 to 8,000 insects."

RESEARCH.

In spite of the large amount of routine work, a number of original investigations have been pursued. An attempt has been made to give each worker the entire material obtainable relating to his subject. Thus, Doctor Musgrave, who has undertaken work regarding the biology of amœbæ and of amœbic dysentery, has had placed at his disposel practically everything relating to these subjects which has come into the jurisdiction of the laboratory during the past year. A similar policy has been pursued in regard to the study of bubonic plague by Doctor Herzog; with Doctor Woolley, in regard to the investigation of cattle diseases, etc.

Animal diseases.—In the annual report of the laboratory for 1903 reference was made to Doctor Woolley's study of hemorrhagic septicæmia in the herds of imported carabaos. During the present year he has continued these studies and has reported on some pulmonary lesions produced by the bacillus of hemorrhagic septicæmia of carabaos. (Bulletin No. 12, bureau of government laboratories, biological laboratory.)

In his first case the lesions found in the lungs were so like those of peri-pneumonia that he was at some loss to make a positive diagnosis until careful pathologic and bacteriologic examinations had been made. However, the organism of hemorrhagic septicæmia was isolated from the heart's blood and from the lungs, and hence there was no doubt as to the nature of the disease. Woolley regards this case as one of pure infectious pleuro-pneumonia.

In a further study of the diseases afflicting carabaos in these islands, Woolley encountered in one of his necropsies an interesting bacterium, which he has described as *Bacillus violaceus Manilæ*, a pathogenic micro-organism. (Bulletin No. 15, bureau of government laboratories, biological laboratory.) The bacillus was found to be markedly pathogenic for guinea pigs and rabbits. When inoculated subcutaneously into monkeys, cats, dogs, and a calf it produced abscesses. Subcutaneous injections into guinea pigs and rabbits produced extensive areas of necrosis at the point of inoculation, hemorrhagic infarcts in the lungs, and miliary abscesses in the spleen and liver.

Reference has already been made to the discovery of cases of Texas fever among the cattle imported into the islands, and to the identification and description of the ticks found on those animals. Mr. Banks's description of the ticks was published in Bulletin No. 14, bureau of government laboratories, biological laboratory. A report on the experimental work upon the subject of Texas fever was also made by Drs. J. W. Jobling and P. G. Woolley, which will be discussed under the report of the serum laboratory.

Bubonic plague.—In connection with their work on bubonic plague, Dr. M. Herzog, pathologist, and Mr. Hare, assistant bacteriologist, have investigated the question of whether latent or dormant plague exists in places where the disease is endemic.[a]

They obtained cultures from the blood of 245 individuals, consisting of native Filipinos and Chinamen, an effort being made to examine those who were particularly exposed to plague infection. From none of the cases were plague bacilli isolated, and Doctor Herzog and Mr. Hare concluded that latent plague with the presence of plague bacilli in the circulating blood, in the absence of clinical symptoms, does not exist.

While engaged in his plague studies Doctor Herzog encountered a case which had supposedly died of this disease. However, at necropsy no lesions of plague were found, and the bacillus of pest was not isolated. Instead, a bacillus was obtained which on all culture media produced an intense golden-yellow pigment. Doctor Herzog named this organism *B. aureus fœtidus*. He regards this bacillus as one which is probably not very pathogenic under ordinary conditions, and which, as a rule, is a harmless saprophyte, but which may

[a] Bulletin in press.

become parasitic under certain circumstances and lead to a fatal issue. (See Bulletin No. 13, bureau of government laboratories, biological laboratory.)

Cholera.—Dr. William B. Wherry, bacteriologist of the laboratory, has pursued a study of some of the biological properties of the cholera spirillum. After making a careful preliminary study of the variations which occurred in one strain of cholera spirilla, he compared it with other cultures of this organism from different sources. His work will shortly appear in Bulletin No. 19, bureau of government laboratories, biological laboratory.

Amœbic dysentery.—Doctor Musgrave, senior pathologist of the laboratory, has throughout the year devoted himself to the study of this subject, and has pursued extensive and important experiments relating to the cultivation and etiologic significance of amœbæ. With the assistance of Mr. Moses T. Clegg, assistant bacteriologist, he has prepared a bulletin on this subject (No. 18, bureau of government laboratories, biological laboratory). It is regretted that space forbids the consideration of this article in detail.

They concluded that amœbæ are the etiologic factors in the disease generally known as amœbic dysentery, and that by following the methods described in their paper, such amœbæ may be grown on artificial media, and the disease reproduced in monkeys and man by the injection of these cultures. Amœbæ may be reclaimed by culture from the stools or the intestinal ulcers of the inoculated animal. Doctor Musgrave has in addition prepared a valuable paper upon the treatment of amœbic dysentery, which will appear as Part II of this same bulletin (No. 18).

Studies in immunity.—During the year I have devoted a portion of my time to the study of certain problems in immunity. Experimental work upon protective inoculation against Asiatic cholera has been continued, and a prophylactic against this disease has been prepared, which when injected into man causes practically no local reaction and only very slight general manifestations. By a single subcutaneous inoculation into man of this prophylactic a bactericidal immunity of from 0.33 to 0.25 milligrams has been obtained; that is, 0.33 to 0.25 milligrams of the sera of the inoculated individuals will protect a guinea pig against ten times the dose of living spirilla fatal for these animals.

Work upon a more satisfactory preparation of prophylactic against bubonic plague has also been commenced in the biological laboratory. In connection with these problems in immunity I have also completed an experimental study upon "some questions relating to the virulence of micro-organisms with particular reference to their immunizing powers." A consideration of this subject and the results of the experimental work will appear shortly as a bulletin from this laboratory.

Skin diseases.—During the year some attention has been given to the contagious skin infections occurring in the Philippine Islands, and cases of tinea imbricata microsporon furfur and of yaws have been found in Manila and studied both clinically and microscopically. These investigations will also shortly appear as bulletins from the laboratory.

Smallpox.—Doctors Brinkerhoff and Tyzzer, of Harvard University, who are at present guests of the laboratory, have devoted their attention to certain problems in variola and vaccine since their arrival in the Philippine Islands, eight months ago. Their work is not yet ready for publication, but will probably appear some time during the autumn of the present year.

TABLE I.—*Clinical laboratory examinations performed during the year.*

[Positive.—Examinations showing organisms. Negative.—Examinations showing absence of organisms.]

	Civil hospital			Bilibid prison.			Private physicians.			Board of health.		
	Positive.	Negative.	Total.	Positive.	Negative.	Total.	Positive.	Negative.	Total.	Positive.	Negative.	Total.
Sputum	39	173	212	48	233	281	11	18	29			
Blood for malaria	23	163	186					6	6			
Blood counts			366						4			
Blood for serum reactions	4	46	50				11	6	8			
Blood, miscellaneous			4									
Gonococci	16	27	43							1,487	14,593	16,080
Feces			1,476			62			22			
Pseudo-farcy												11
Glanders												3
Surra										1,123	8,446	9,569
Necropsies												271
Rats for plague												1,905
Waters, lemonades, etc												33
Total			2,337			343			69			27,862

TABLE I.—*Clinical laboratory examinations performed during the year*—Continued.

	Police surgeon.			Other institutions.			Aggregate.		
	Positive.	Negative.	Total.	Positive.	Negative.	Total.	Positive.	Negative.	Total.
Sputum							98	424	522
Blood for malaria	2	7	9				25	176	201
Blood counts									370
Blood for serum reactions							6	52	58
Blood, miscellaneous									4
Gonococci							1,503	14,620	16,123
Feces			27						1,567
Pseudo-farcy									11
Glanders									3
Surra							1,123	8,446	9,569
Necropsies									271
Rats for plague									1,905
Waters, lemonades, etc.						32			65
Miscellaneous									141
Total			36			32			30,830

TABLE II.—*Blood examinations.*

	Civil hospital.						Police surgeon.					
	Native.			Foreign.			Native.			Foreign.		
	Positive.	Negative.	Total.	Positive.	Negative.	Total.	Positive.	Negative.	Total.	Positive.	Negative.	Total.
Erythrocytes count			5			13						
Erythrocytes count (differential)						2						
Leucocytes count			55			283						
Leucocytes count (differential)			5			4						
Malaria	4	33	37	19	130	149				2	7	9
Tertian	3			9						2		
Æstivo-autumnal				10								
Quartan	1											
Serum reactions			10	4	35	40						
Typhoid fever				4								
Malta fever					1							
Miscellaneous						4						
Total			102			494						9

	Private physicians.						Total.						Aggregate.
	Native.			Foreign.			Native.			Foreign.			
	Positive.	Negative.	Total.	Positive.	Negative.	Total.	Positive.	Negative.	Total.	Positive.	Negative.	Total.	
Erythrocytes count									5			13	18
Erythrocytes count (differential)												2	2
Leucocytes count			2			1			57			283	340
Leucocytes count (differential)						1			5			5	10
Malaria		4	4		2	2	4	37	41	21	118	160	201
Tertian							3			11			
Æstivo-autumnal										10			
Quartan							1						
Serum reactions	2	5	7		1	1	2	15	17	4	37	41	58
Typhoid fever	2						2			4			
Malta fever											1		
Miscellaneous												4	4
Total			13			5			115			508	624

TABLE III.—*Sputum examinations for tubercle bacilli.*

	Native.		Foreign.		Total.
	Positive.	Negative.	Positive.	Negative.	
Civil hospital	23	85	16	88	212
Bilibid prison	48	225		8	281
Private physicians	7	13	4	5	29
Total	78	323	20	101	522

TABLE IV.—*Examinations of feces.*

Parasites.	Native or foreign.	Civil hospital.	Bilibid prison.	Private physicians.	Police surgeon.
Amœbæ	Native	32	15	2	3
	Foreign	268	7	9	18
Monads	Native	28	7	2	3
	Foreign	118	5	5	2
Strongyloides intestinalis	Native	5	5	1	
	Foreign	1	1		1
Ova trichocephalus dispar	Native	22	12	2	1
	Foreign	26	2	4	
Ova uncinaria duodenale	Native	24	6	2	
	Foreign	23	2	1	
Ova ascaris lumbricoides	Native	18	10	1	1
	Foreign	24	2	1	1
Ova tænia	Native	3			
Balantidium coli	do	2	1		
	Foreign	1			
Magastoma entericum	Native		2		
	Foreign	1	2	1	
Oxyuris vermicularis	Native		3		
	Foreign		3	1	
Tænia trichocephalus dispar, strongyloides, uncinaria and ascaris.	Native	3			
Amœbæ strongyloides and tænia	do	1			
Amœbæ, monads, uncinaria, and ascaris	do	3	2		
Ascaris, monads, amœbæ, and trichocephalus dispar.	do	4	1		1
Strongyloides, trichocephalus dispar, and uncinaria.	do	2	1	1	1
Trichocephalus dispar, uncinaria, and ascaris	do	1	2	1	
Ascaris lumbricoides and uncinaria	Foreign	8	1	1	2
Amœbæ and monads	Native	4		1	
	Foreign	38	3	1	1

Total examinations:		
Native		226
Foreign		1,361
		1,587
Total positive amœbæs:		
Native		62
Foreign		302
		364

TABLE V.—*Necropsies.*

Bubonic plague	53	Glanders	2
Asiatic cholera	38	Tetanus	1
Amœbic dysentery	15	Typhoid fever	1
Acute bacillary dysentery	2	Nephritis (various forms)	20
Enteritis (various forms)	10	Carcinoma	3
Beriberi	6	Aneurysma	2
Leprosy	5	Drowning	5
Pernicious malaria	2	Trauma and hemorrhage (accidental or suicide)	8
Smallpox	19	Miscellaneous	33
Tobar pneumonia	27		
Tuberculosis	29		
Septicæmia	6	Total	287

TABLE VI.—*Bacteriological examinations of water supply for the city of Manila and vicinity.*

[Submitted by board of health.]

Date.	Source of collection.	Number of micro-organisms to 1 cm.³	Amœbæ.	Remarks.
1903.				
Dec. 14	Hydrant	400		Following rains.
21	do	550		Do.
28	do	600		Do.
1904.				
Jan. 1	do	460		
1	do	250		
18	do	200		
25	do	200		
Feb. 1	do	150		
8	do	125	Present	
15	do	150	do	
23	Deposito	120	do	
29	Mariquina River	112	do	
Mar. 7	Hydrant	(a)	do	
7	Mariquina River	208	do	
7	do	105		
7	Hydrant	267	Present	
14	do	120	do	
11	do	108	do	
25	do	125	do	
May 9	do	175	do	
23	do	130	do	
June 6	do	206	do	
20	do	135	do	
July 5	do	450	do	After rains.
15	do		do	Do.

a Contaminated.

A series of examinations of water after passing through various filters have also been performed for the city engineer, and in all of the filters amœbæ were present. The bacteriological counts of micro-organisms varied from 150 to several thousand per cubic centimeter, according to conditions of filters.

REPORT OF THE CHEMICAL LABORATORY, COMPILED BY DR. A. M. CLOVER, CHIEF OF THE ECONOMIC PRODUCTS DIVISION.

ROUTINE WORK.

The routine work of the chemical laboratory has consisted mainly in making analyses for the different departments of the government, and also for private persons whenever requested. A classified list of these analyses is given which will show the amount and variety of this work, the number made having increased to nearly double that of the preceding year. The important items in this work are as follows:

Analyses for the civil hospital for clinical purposes; of various substances for the custom-house, to determine their classification under the tariff and to detect adulterations; of soils and other agricultural products for the bureau of agriculture; of minerals for the mining bureau; of waters, chiefly for the board of health, and of soils for the forestry bureau. A number of examinations connected with criminal proceedings, involving the detection of poisons in the stomach, blood stains, etc., and analyses of a great variety of products for private persons have been completed; indeed, nearly all the departments of the government have had occasion to call upon the chemical laboratory for more or less analytical work. Other work, not analytical, has been undertaken, principally for the offices of the government; for example, the standardizing of various instruments, the distillation of oil in vacuum, the carrying out of experiments concerning questions such as the use of carbolic acid in disinfecting, and of chemicals for protecting wood against attack by ants; also an investigation concerning the explosion of gunpowder with fatal results at Mariveles. In addition, the laboratory has frequently been called upon to render opinions on questions within its domain.

The laboratory has from time to time made various analyses of interesting products which have been brought to its attention through various sources. A careful record has been kept of such work in order to preserve it for future reference. In the table this class is placed under the heading of analyses made for the "bureau of government laboratories."

In some cases work or analyses asked for were of so peculiar a nature as to necessitate the devising of special methods and the construction of special apparatus.

The toxicological and other criminal work has often taken a considerable amount of time, and it has been necessary for the chemist who undertook the examinations frequently to appear in court and to give testimony.

Table of analyses.

	Alcohols.	Assays.	Beverages.	Coals.	Criminal (not poison).	Foods and food stuffs.	Fertilizers.	Metals and alloys.	Medicines.	Minerals.	Oils.	Paints, varnishes, colors, etc.
Board of health						1						
Bureau of agriculture						29	4				2	
Bureau of government laboratories				17			2		2	13	4	
Ethnological survey								3		4		
Civil hospital						1						
Customs house			2			8		22			6	137
Exposition board		16										
Forestry bureau	3									1		1
Insular purchasing agent	3			8					3		12	3
Mining bureau		10		10			1	3		14		
Private	2	108	6	6		2	6	3		1	4	1
Secret service					5							
Bureau of architecture											2	1
Other government institutions and officers			3	3				10		7	1	
Total	8	134	11	44	5	41	13	41	5	40	31	143

	Toxicological.	Soils.	Textiles.	Urines.	Waters, mineral.	Waters, sanitary.	Resins.	Proprietary articles.	Gastric juice.	Miscellaneous.	Total.
Board of health	1				3	27					32
Bureau of agriculture		63								8	106
Bureau of government laboratories	3			6	1	4			1	3	56
Ethnological survey										1	8
Civil hospital				449					7		457
Customs house			4						8	13	200
Exposition board							4				20
Forestry bureau		26				1	2			7	41
Insular purchasing agent											29
Mining bureau											38
Private				33		1	2			10	185
Secret service											5
Bureau of architecture		1									4
Bilibid prison				99							99
Police department				18							18
Other government institutions and officers	4	6				1				2	37
Total	8	96	4	605	4	34	8	8	8	44	1,335

The laboratory has continued to manufacture acetozone in sufficient quantity to be able to supply all demands made upon it for this substance.

MINERALS.

The character of the minerals submitted for analyses have varied widely, the specimens including the oxides of iron (hematite, limonite, magnetite), the various sulphides of copper and iron (chalcocite, chalcopyrite, pyrite), as well as quartz. A number of samples of concentrates have also been examined, and a few of galena have been assayed for silver.

Gold.—During the last year the greater number of samples of gold-bearing mineral have come from the two provinces Benguet and Masbate. With reference to the values obtained it may be said that they vary to a great extent. The majority are negative, so far as commercial quantities of gold are concerned, but it is noticeable that relatively few samples

contain absolutely no gold, almost all having at least an unweighable trace or "color" o gold. Some of the higher values are $60.36, $40.64, $88, $49.61, $87.65, and $246, all fro Benguet. One sample from a rich pocket in Benguet showed an assay of a little less tha $5,000. (All the above values are in United States currency.) Good values have also bee obtained from the ores of Masbate.

Silver.—This metal has not yet been found in commercial quantities.

Platinum.—The first platinum ever definitely identified in the islands, so far as the recor either of this or of the mining bureau show, was recently separated in the laboratory fro some magnetic sand obtained from Rizal Province. In 5.96 grams of sand 25.88 miligran of platinum was found.

Copper.—Some of the assays of copper are very high, running between 40 and 50 per cer of metallic copper.

Coal.—The following are typical analyses of samples of coal submitted:

[From the island of Bataan.]

	1.	2.	3.	4.	5.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cen*
Moisture	6.30	6.40	6.50	2.40	2.
Volatile combustible	39.40	39.70	40.60	39.40	41.
Fixed combustible	46.80	46.50	46.00	47.00	42.
Ash	7.50	7.40	6.90	11.20	13.
	100.00	100.00	100.00	100.00	100.
Sulphur	.53	.45	.60	2.10	2.

None of the above showed coking properties. The following are also from Bataan:

	6.	7.
	Per cent.	*Per cen*
Moisture	6.9	9.
Volatile combustible	36.9	38.
Fixed combustible	40.0	43.
Ash	16.2	8.
	100.0	100.

The following are from Cebu:

	1.	2.	3.	4.
	Per cent.	*Per cent.*	*Per cent.*	*Per cen*
Moisture	17.3	16.6	14.7	5.
Volatile combustible	32.8	33.6	38.4	44.
Fixed combustible	46.2	47.8	41.6	48.
Ash	3.7	9.0	5.3	2.
	100.0	100.0	100.0	100.

Most of the samples submitted showed no coking properties, but one sample from Ceb so far as could be judged from the small quantity at hand, would produce good coke. A is shown by the analyses, many of the coals are high-grade lignites. Many of the sampl brought to the laboratory are only surface samples, the original character of which hav been changed by weathering. Often, too, samples have adhering rock material, whic shows that they have been taken from the edge of the vein.

Miscellaneous.—About a dozen samples of galena of varying purity have been submitte for analysis, and a few iron determinations in iron ores have been made. Two samples manganese ore showed in one case 55 per cent and in the other 52.9 per cent metallic man ganese.

About $300 worth of gold has been smelted and refined in the laboratory. Some plac gold from Benguet was found to have a fineness of 769.8, and from the same province som quartz gold was found to be very nearly the same.

Clays and limestones.—The classes examined have been both of the "fat" variety, cor taining much plastic material, as well as of the "lean" or highly siliceous ore. Many a white, even after exposing to a high oxidizing heat. A few of these have been analyze

The limestones examined have been of various kinds—coral, marble, oolitic, etc. It is evident that the two essentials for the production of cement are to be found in great variety and abundance in the islands.

Following are some analyses of clays and limestones:

CLAYS.

	1.	2.
Silica	45.24	71.16
Alumina	37.59	16.94
Iron oxide	1.00	.48
Titanium oxide	.70	.58
Lime	.66	.57
Magnesia	None.	.23
Soda	None.	.46
Potash	1.69	5.64
Water 125°	1.24	1.56
Loss on ignition	12.67	3.22
	100.79	100.84

LIMESTONES.

	1.	2.	3.
SiO_2	38.07	0.88	0.65
Fe_2O_3	9.83	.47	.38
CaO	27.75	54.61	54.62
MgO	.88	.72	.70
CO_2	22.80	43.62	43.60
Moisture	6.48		.70
	99.33	100.30	99.95

WATER SUPPLY OF MANILA.

A systematic examination of the city water supply has been carried on by Mr. Chas. L. Bliss, of the laboratory, during a period covering seven months. These analyses were made nearly every week and were generally of water taken directly from a tap. A few samples were from the Mariquina River at different points between the city and the source. The examination consisted principally of the usual sanitary analysis, but in addition to this a bacteriological examination has also been made by the biological laboratory. The data obtained are important in several respects and will be published in the form of a bulletin.

The maximum and minimum amounts of different substances found during this period are given in the following table. The great divergence in the two values is to be explained by special conditions existing at the time the sample was taken:

	Minimum.	Maximum.
Total residue	153.00	220.00
Fixed residue	127.00	190.00
Loss on ignition	16.00	46.00
Nitrites (N)	.00	Trace.
Nitrates (N)	Trace.	.36
Free ammonia (N)	.00	.036
Albuminoid ammonia (N)	.031	.10
Oxygen consumed (O)	.65	2.20
Chlorine (Cl)	2.13	4.40
Hardness	58.80	109.00

WORK OF INVESTIGATION.

This work, which is considered of the highest importance, has been carried on as far as existing conditions would permit. In our present poorly equipped quarters it is very difficult to prosecute such work thoroughly. Of the two employees of the laboratory designated especially for this work, one has been absent from his post during the entire year on account of illness, and the other, to whom the field was entirely new, has been employed during the past five months only. Among the other members of the laboratory staff, who are generally kept busy with routine work, it has been possible to allow Mr. H. S. Walker considerable time to prosecute the work on cocoanuts, which was begun during the previous year.

Cocoanuts.—The ulitmate purpose of this investigation will be to give a comprehensive bulletin on the yields of oil which may be expected in the islands, the nature of the nuts which are best adapted for planting, and the results which may be expected from large quantities of nuts, such as are necessary for an adequate basis of supply for factory purposes. In this connection, the first problems studied were the conditions which pertain to the nourishment of the trees and the relation of the soil in which they grow to the oil contents of the nuts produced. As the age of the nuts is a very important factor in the percentage of oil, a study of the change in this percentage by increasing age was also made.

Considerable work was done in devising a method for the rapid and accurate estimation of oil in copra, and the one finally adopted is very satisfactory. The materials used in the investigation were obtained on the government farm at San Ramon, from which samples of soils systematically collected from various locations were also sent to the laboratory. It has been observed that cocoanut trees growing near the seashore were larger and more prolific than those farther inland, and it has also been stated that the former yield a better quality of nut. The analyses of the soils gave only slight differences between those near the shore and those farther inland, and an explanation for the variation spoken of must be sought in a different connection, and after more extended study. For this purpose samples of cocoanuts were systematically collected at the farm to determine the relations which existed between the quality of the nut and its environment. In order to obtain correct results, it was necessary to make analyses on the spot, and this work was done in a small experimental laboratory temporarily fitted up at San Ramon. After all preliminary work on these samples had been completed, they were forwarded to the laboratory in Manila for the final determinations. In all about 150 specimens have been completed. Experiments have also been made to determine the comparative effect upon the quality of the oil obtained from copra prepared by the two usual processes, sun drying and drying on a grating over a slow fire. Work is now being carried on concerning the effect caused by bacteria growth on copra, both as to the quality and quantity of the oil which can be produced from the product after exposure to the usual micro-organisms. All of these results on this subject are about to be published in the form of a bulletin.

Resins, etc.—A systematic study of the resins, gums, and balsams, which occur so plentifully in the islands, has again been taken up, and it is hoped and expected that this work may be completed during the coming year with fruitful results.

GENERAL.

Extensive chemical work in the Tropics being almost a new venture, we are brought face to face with many conditions and problems in carrying on the work which have never heretofore been encountered, and it is to be expected that the laboratory will not reach its maximum efficiency until time and experience have shown the best policy to be pursued in dealing with these new conditions. The many difficulties with which the laboratory has contended in the past have been cited by the superintendent of government laboratories in past reports; they are gradually being eliminated, but some remain still to be considered.

As to the equipment, it is thought that there will be little to be desired, owing to the fact that the superintendent has given a large portion of his time during the past three years in planning and providing for the new laboratory. However, on account of the large variety of apparatus and chemicals which are used in chemical routine and research work, a large portion of which is perishable, breakable, or expendable, it is necessary to use much study and foresight in order to maintain in advance a perfect supply, such as the various exigencies of chemical work may require. Too much stress can not be laid upon this matter, and to accomplish the end desired it will be necessary to employ exclusively for this purpose a man with a knowledge of chemical apparatus and supplies. The necessity of this work is recognized in all well-equipped laboratories, and the matter is of much greater importance here on account of the great delay experienced in obtaining what is needed.

The need of one or more collectors for the laboratory was pointed out by the superintendent of government laboratories in the last annual report, and it should again be emphasized.

The laboratory has been greatly handicapped in its work for the following causes: First frequent periods of illness of employees; second, frequent changes, necessitating the taking on of new and inexperienced men; third, long leaves of absence. As an example of what is meant, it may be cited that at present two of the posts in the laboratory are vacant, and it will be impossible to fill them before six months are past. One employee is on extended leave in the United States, and one is suffering from illness. If the laboratory would reach its highest degree of efficiency, the number of chemists employed in routine work must be sufficiently large to provide for such exigencies, so that an investigator who has begun an important piece of work need not be compelled to periodically leave it in order to clear up routine matter which may need attention, and which could very well be taken by the analytical staff if it were sufficient for the work on hand.

REPORT OF DR. JAMES W. JOBLING, DIRECTOR OF THE SERUM LABORATORY, FROM SEPTEMBER 1, 1903, TO JUNE 15, 1904.[a]

The work done during the period covered by this report has been very varied in character, and owing to the lack of assistance during the first part of the year, we were unable to follow it up as completely as it would otherwise have been done. After the arrival of Dr. E. H. Ruediger, who reported for duty on December 12, 1903, the pressure was greatly relieved by his taking charge of the preparation of serums (excepting rinderpest serum) and of the routine microscopical examinations. During the first half of the year a large amount of time was consumed in supervising the inoculation of carabao which the government was importing.

Dr. Paul G. Woolley, formerly pathologist in the biological laboratory, was appointed assistant director on February 1, 1904, and since then has supervised the preparation of vaccine virus, the general bacteriological work, and at the same time he has been engaged in research work.

The few changes which have been made in the preparation of antirinderpest serum, vaccine virus, plague prophylactic, etc., will be taken up under their respective headings.

The development of Texas fever in nonimmune animals brought from the United States and which were being made immune to rinderpest by the "simultaneous method," made the immunization of similar animals a matter of difficulty and necessitated a change in the method. The development of this disease is dwelt upon fully in Bulletin No. 14 of this bureau. Since this bulletin was issued, four more animals have been inoculated for the purpose of rendering them immune against Texas fever, with one death.

A number of changes have been made in the laboratory grounds and buildings since my last annual report. These consist chiefly in additions and improvements to the buildings which were present at that time, and in the filling of some of the holes on the grounds. The latter work was done entirely with the animals belonging to the laboratory. A fly-proof stable was erected for imported high-class cattle, which were placed at the laboratory to be immunized against rinderpest.

Great difficulty has been encountered in the breeding and raising of small animals, such as rabbits, guinea pigs, white rats, and mice for laboratory use. During the last two years nearly all of the animals intended for experimental purposes have been imported from China and Japan. In order to have a breeding place belonging to the laboratory, three small buildings, formerly used as a hospital for infectious diseases, and which were on ground adjoining the laboratory, were obtained from the insular board of health. The rooms were divided into pens and the small animals placed under the supervision of Inoculator Thomas Bean. These arrangements have only been completed a few months, but during this time the animals formerly on hand have nearly doubled in number, and it is believed that no trouble will be experienced in furnishing the laboratories with all of this class of material required.

Until March 1, 1904, the veterinary surgeons and inoculators engaged in the immunization of provincial cattle and carabaos against rinderpest were under the supervision of the director of the serum laboratory, but on the above date the veterinary corps of the board of health was organized, and Chief Veterinarian John G. Slee assumed charge. The organization of this department was a great relief to the director of the serum laboratory, as it diminished his executive work, and lessened the necessary clerical details of the laboratory.

The provincial rinderpest inoculations were even more successful than during the previous year. To a certain extent this is probably due to the fact that the natives are becoming more accustomed to having their animals inoculated, and are discovering that where such inoculating is being done an epidemic is quickly suppressed.

Owing to the opposition of the people, the inoculators have seldom been able to treat more than 50 per cent of the animals in any one locality; but recently, because of the good results of the earlier work, the natives have requested inoculators to be sent to their respective towns to immunize the animals which could not be obtained on the first visit. Such requests have been very gratifying to this laboratory for, recognizing the opposition with which the innovations are generally received by the natives, it shows an increase in their confidence, so that future work in these localities will be complete, and thus the necessity of frequent trips owing to the presence of nonimmune animals will be obviated.

Because of the presence of so many infectious diseases of animals in the archipelago the preparation of antiserums is a matter requiring the closest attention and the complete isolation of the animals used for this purpose. During the fall of 1903, we lost all of our serum horses from surra, and since then several calves have died from the same cause. In the preparation of antirinderpest serum, we were continually on the watch for foot-and-mouth disease, hemorrhagic septicemia, and surra. In calves, in addition to the diseases

[a] Doctor Jobling resigned on June 30, 1904, to be succeeded by Dr. Paul G. Woolley on July 1.

just mentioned, a number have recently died of pneumonia, the cause of which is undet mined. This subject is being investigated by Assistant Director Paul G. Woolley.

The greatest demand during the past two years has been for antiplague and antirinc pest serums. For this reason not much attention has been paid to the preparation others, although the immunization of two horses for diphtheria antitoxin has been beg and it is the intention to keep at least one animal for tetanus.

During the first part of May the director was appointed a member of a committee make recommendations as to the disposition of 135 government carabaos, located Bacolod, Negros, and which were infected with surra. A copy of the committee repor now on file in the office of the superintendent of government laboratories.

ANTIRINDERPEST SERUM.

The statement was made in our last annual report that "the method of using virul blood which had been drawn into potassium citrate solution, to prevent coagulation, the inoculation of serum animals, had not been in use for a sufficient length of time to mak definite statement as to its value." This method has now been tried during the period cove by this report and we believe, for the reasons given at that time, that it is the best one the production of antirinderpest serum. Post-mortem examinations are always held the virulent-blood animals before the blood is used for the inoculation of serum anim With the exception of holding a post-mortem on the animal bled, this method is also u in the provinces, thus allowing the inoculator, after obtaining blood in one locality, inoculate the animals in the surrounding barrios by the "simultaneous method."] very few serum animals have shown abscesses following its use. Even when they recei very large amounts of the virulent blood the absorption was very rapid, the swelli having entirely disappeared within a few days after inoculation.

Veterinarian Walter Sorrell, attached to this laboratory, has had charge of the prepa tion of all the rinderpest serum since his arrival on August 18, 1903, and to his intellig supervision of this work, as well as to his care of the other animals attached to the labo tory, a large portion of credit for the work which has been accomplished is due.

As mentioned in my last report, owing to the difficulty of obtaining nonimmune anim just when they were needed, we were unable to fix the dosage of the serum before its sh ment into the provinces. The virulent blood used for inoculating the serum animals v obtained from cattle imported from Shanghai, China. Up to the present time we h been more successful in producing the disease in these animals than in those obtai from any other point.

The cost of preparing the serum is ordinarily very great, but owing to arrangeme made with local cattle dealers, the virulent-blood animals not contracting the disease a those serum animals which could not be further used for the production of serum w traded for new ones, and thus a considerable reduction in the cost of the product v realized.

TABLE 1.—*Number of cattle purchased, exchanged, and sold during the period covered this report.*

Month.	Purchased.	Exchanged.	Sold
1903.			
September	32	6	
October	9	11	
November	30		
December	20	13	
1904.			
January	12		
February	22		
March		20	
April	10	8	
May	11	20	
June (15)	10		
Total	156	78	

The approximate saving to the government by means of these exchanges amounts about 5,040 pesos Philippine currency.

TABLE 2.—*Amount of antirinderpest serum prepared and distributed.*

Month.	Prepared.	Issued.	Returned.	Sold.
1903.				
September	123,750	93,450		
October	60,000	164,450		
November	146,400	210,300		
December	98,400	171,300	40,000	
1904.				
January	111,900	123,300	6,000	
February	133,200	22,600		18,000
March	54,600	39,600	4,800	24,000
April	123,990	90,000		
May		103,300		
June (15)	128,400	146,500		
Total	980,640	1,164,800	50,800	42,000

There were on hand September 1, 1903, 177,450 cm³ of serum and 27,100 cm³ were taken up later.

TABLE 3.—*Number of animals inoculated in the laboratory, with the amount of serum and blood used.*

Month.	Inoculated with serum.	Amount of serum.	Inoculated with blood.	Amount of blood.
1903.		*Cm.*³		*Cm.*³
September	26	1,760	118	69,412
October	42	2,100	64	31,443
November	78	6,150	96	43,309
December	68	6,800	153	55,536
1904.				
January	65	6,400	107	51,670
February	47	4,080	114	34,310
March	28	1,550	126	52,965
April	17	1,700	97	66,388
May	21	4,150	64	56,782
June (15)	20	1,950	17	14,554
Total	412	36,640	966	476,369

The "simultaneous method" was used but very seldom in the immunization of cattle and calves belonging to the laboratory, for, as stated in my last annual report, so many were infected at the time of admission that the mortality was very high when this method was employed. As a consequence the course adopted was to inoculate the animals with 50 to 100 cm³ of serum and a few days later with 1 to 10 cm³ of virulent blood.

A large number of blood smears were examined for the presence of the surra parasite. The results are noted in the table given below.

TABLE 4.—*Surra examination.*

Month.	Number of examinations.	Positive.
1903.		
November	1	1
December	215	32
1904.		
January	309	19
February	527	74
March	152	14
April	5	1
May		
June (15)	5	2
Total	1,214	143

RINDERPEST SERUM—PROVINCIAL INOCULATIONS.

Rinderpest having been reported to be present in the province of Ilocos Sur, Veterinar Thomas Owens was directed to proceed to that province for the purpose of inoculat all the remaining animals against the disease.

Doctor Owens was only able to find three sick animals and was unable to obtain bl from any one of them; for this reason he used serum alone in doses of 50 cm³ each.

TABLE 5.—*Number of animals inoculated in each locality.*

Vigan	50	Ran Cohlina	
Casayan	113	Lape	
Santa	21	Harvacan	
San Domingo	39		
Magsingal	54	Total	

No cases of the disease have been reported in this province since Doctor Owens return so that it is presumed that the epidemic was stopped in its infancy.

Chief Sanitary Inspector Lewis Barron, detailed by the board of health for duty in provinces of Bontoc and Benguet, inoculated 307 animals during January and 425 dur the month of February, 1904. Mr. Barron has never been trained in the method of ble ing a sick animal, so he was unable to use the "simultaneous method." He has been k supplied with antirinderpest serum, and when he was notified that the disease had appea at any point in the province in which he was working he inoculated all the animals in t locality with 50 cm³ of serum. By following this method the disease has not been able gain any headway, in each instance being stamped out at once.

Rinderpest having been reported in the province of Ambos Camarines, Chief Inocula Albert M. Newby, accompanied by two board of health inoculators, was ordered to proc to that point for the purpose of inoculating the remaining animals.

TABLE 6.—*Number of animals inoculated and the results obtained.*

Barrio.	Simultaneous.		Serum.		Tot
	Number inoculated.	Deaths.	Number inoculated.	Deaths.	
Magarao	146	3	44	3	
Calabanga			215		
Total	146	3	259	3	
Mortality.....per cent..	2.05		1.14		

A communication having been received during the first part of October stating tl rinderpest was present in the province of Cagayan, Veterinarian A. R. Glaisyer, accompani by three inoculators, was ordered to proceed to that province for the purpose of immunizi the remaining animals. The party left October 20, 1903.

TABLE 7.—*Method of inoculation used, the number inoculated in each locality, and the resu obtained up to March 1, 1904.*

Barrio.	Simultaneous.		Serum.		Total.	
	Number inoculated.	Deaths.	Number inoculated.	Deaths.	Number inoculated.	Deatl
Minanga, Piat	49		3		52	
Apayao, Piat	97	1	8		105	
Aquit, Piat	88		5		93	
Magguiling, Piat	92		3		95	
Macapit	18		2		20	
Ensile	324	7	16		340	
Piat	79		73		152	
Gatasavan	57		36		93	
Bisisug	11				11	
Maggiling	116		4		120	
San Isidro	85				85	
Tuao	89		6		95	
Total	1,105	8	156		1,261	
Mortality.....per cent..	0.6					

The results of the inoculations after March 1 are included under the heading of Cagayan in Table 8. In each locality where the inoculations were done rinderpest was quickly suppressed, only those animals which were in the incubation stage at the time of inoculation afterwards developing the disease.

TABLE 8.—*Summary of all provincial inoculations from September 1, 1903, to June 15, 1904.*

Province.	Simultaneous.		Serum.		Total.	
	Number inoculated.	Deaths.	Number inoculated.	Deaths.	Number inoculated.	Deaths.
Ilocos Sur			644		644	
Lepanto			732		732	
Ambos Camarines	146	3	259	3	405	6
Cagayan	2,257	74	17		2,274	74
Bulacan	364	29	48		412	29
Capiz			20	1	20	1
Iloilo	289	21	361	1	650	22
Cebu	122	3	138		260	3
Union			2,244		2,240	
Total	3,177	130	4,464	5	7,641	135
Mortality.....per cent	4.09		0.11		1.76	

A large number of animals have been inoculated during the last two months, but as complete reports have not been received from the veterinarians in charge the results can not be fully noted in the above table.

VACCINE VIRUS.

But few changes were made in the preparation of vaccine virus as it was described in my last annual report. The chief one consists in the use of carabao calves in the preparation of the seed virus. The method of immunizing the calves against rinderpest has been given above.

During the period beginning September 14, 1903, and ending February 1, 1904, Mr. Charles B. Hare was in charge of the preparation of the virus. Mr. Hare had considerable experience in this line of work and during the time he was in charge was by constant attention able to improve both the quality and quantity of the virus previously obtained.

Since February 1, 1904, Mr. W. D. Cheek has taken up this work under the supervision of Assistant Director Paul G. Woolley.

From the experience obtained during the past two years we have become convinced that the best animal to use in the preparation of vaccine virus, at least in this portion of the Orient, is the carabao calf, but because the majority of the local carabaos have died from rinderpest, we have been unable to obtain a sufficient number of the calves for our purposes. For this reason we have been using this class of animal for preparation of the "seed" virus only and ordinary calves for the production of that used commercially. By using seed virus which has not been passed through more than two calves we have been able to supply the board of health with all the material called for, and we believe the quality is equal to that of any virus to be obtained elsewhere in the world.

Reports received from the Marine-Hospital Service and from members of the board of health show a record of most favorable results. Last year we experienced much difficulty in preparing vaccine virus during the hot months, so that this season we manufactured a large amount during the cooler season, keeping it in stock and avoiding the vaccination of animals during hot weather.

TABLE 9.—*Number of calves bought obtained by transfer, vaccinated, and the number from which virus was collected during the period covered by this report.*

Month.	Purchased.	Obtained by transfer.	Vaccinated.	Number from which virus collected.	Number sold.
1903.					
September	14		17	14	2
October	9		18	12	
November	14		26	20	
December	44		27	33	
1904.					
January	58		39	30	
February	26		27	25	1
March	15		26	23	3
April			9	9	
May	1	26	8	5	
June (15)	6				
Total	187	26	197	171	6

The discrepancy in many instances is due to the fact that a number of grown animals were vaccinated for experimental purposes, with some failures, and some of the calves developed either foot-and-mouth disease or rinderpest.

The approximate saving to the government on exchange of calves amounts to about ₱1,820 Philippine currency and by sale ₱2,112 Philippine currency, or a total of ₱3,932 Philippine currency.

TABLE 10.—*Amount of virus prepared, amount issued to the board of health, and amount used in the laboratory.*

Month.	Prepared.	Issued.	Surplus seed for distribution.
1903.			
September	136,200	75,550	
October	53,100	56,793	
November	37,360	60,700	
December	90,000	122,900	
1904.			
January	701,000	170,180	
February	366,180	211,200	
March	537,000	225,210	182,00
April	110,000	231,050	
May	85,000	176,950	
June (15)		130,900	
Total	2,115,840	1,461,433	182,00

On hand September 1, 1903, 3,543 doses.

PLAGUE PROPHYLACTIC.

During the first part of the year plague prophylactic was prepared chiefly after the method of Shiga, but recently this has been discontinued and that of Haffkine used instead

TABLE 11.—*Amount of Shiga's and Haffkine's prophylactic prepared and the amount issued to the board of health.*

Month.	Shiga's prophylactic.		Haffkine's prophylactic.	
	Prepared.	Issued.	Prepared.	Issued.
1903.				
September		2,000		
October				
November	7,242	8,120	2,346	
December	1,800	5,480		465
1904.				
January		2,806		
February				
March				
April				
May			7,805	245
June (15)				
Total	9,042	18,406	10,151	710

On hand September 1, 1903, 9,364 doses.

ANTIPLAGUE SERUM.

The death from surra of all our serum horses has prevented the production of this serum during the last year, but we now have on hand six animals, which are as rapidly as possible being brought up to the bleeding point.

These horses are now being kept in a fly-proof stable, and it is hoped from now on we will be able to supply the entire local demand for this product.

This work is being done under the supervision of Dr. E. H. Ruediger.

MALLEIN.

The production of mallein was started during the last year, and from the reports received its use as a diagnostic agent has been attended by the greatest success.

During the period covered by this report 1,050 doses were prepared and 307 issued.

SURRA IN IMPORTED ANIMALS.

A detailed report was made on this subject to the honorable, the civil governor, William H. Taft, before his departure. This report was complete up to and including November 30, 1903, since which time the animals have been so scattered that our records are very incomplete and no attempt will be made to give figures. For this reason the subject will be dwelt on only in a general way.

As stated in the report, Dr. Paul G. Woolley, at that time pathologist in the biological laboratory, was the first to find a large number of the animals imported for the Government to be infected with the surra parasite. This discovery was made on October 22, 1903, and up to November 30, 1903, 214 infected animals were killed by the board of health. One hundred and ten of these belonged to the lot of animals which were permanently immunized in Shanghai. The remainder were among those received after September 5, 1903, and which had been temporarily immunized in Shanghai.

Examination of a portion of the animals sold before the discovery that surra was present in these herds, and also of some of those subsequently disposed of, and which, after repeated microscopical examinations, have been called negative, show that a large percentage now harbor the parasite. A number of these animals were killed by the board of health.

When an infected animal is isolated and given the proper food and attention, as is the case when it is in the hands of the native owner, it is yet an unsettled question as to how long it will live. Recently a microscopical examination of the blood of nearly all the carabaos in the city of Manila proved a small percentage to harbor trypanosoma. Nearly all of the infected animals were in excellent condition, but as the length of time during which the parasite had been in their blood is not known it is uncertain what effect it will have on their health.

Where the infected animals are herded they appear to succumb to the disease within a short period of time. It has been noticed that even healthy carabaos are apt to become diseased when herded together in large numbers, and such being the case it is not remarkable that animals suffering from surra should die much more rapidly when kept under the same conditions.

For the above reasons it is believed that if infected animals are isolated and given the proper food, attention, and work they will live for at least a number of months and a certain

percentage even may show a permanent recovery. It must be understood that in making these remarks I am only referring to the course of the disease, but if healthy, uninfected animals are present in the vicinity the wisest course would be to kill the infected animal as soon as the parasite is found.

The director was one of a committee appointed by the honorable the civil governor to examine and make recommendations for the disposition of 135 infected carabaos located at Bacolod, Occidental Negros. Nearly all of these animals had harbored the parasite for from four to five months. Forty-one animals not mentioned in the instructions received from the honorable the civil governor, which had been sold four months before the time of my visit, and which were found to be infected a few days after sale, were also examined. The excellent condition of the majority of the animals was a surprise to the committee, especially the appearance of those which had been working daily for the last four months. This was the case to so marked a degree that the owners would not believe that anything was wrong with the animals. By microscopical examination we were only able to find the parasites in about 25 per cent, but it is probable that animal inoculations would have shown a larger number to be infected.

REPORT OF DR. PAUL G. WOOLLEY, DIRECTOR OF THE SERUM LABORATORY, FROM JUNE 15 TO SEPTEMBER 1, 1904.

The annual report for the serum laboratory is covered by the special report of Dr. James W. Jobling for that part of the year extending from September 1, 1903, to June 15, 1904, and by the following special report of the present director describing the work from June 15 to September 1, 1904.

The only change in the staff of the laboratory was caused by the resignation of Doctor Jobling on July 1, and the appointment of the present director to fill the vacancy caused thereby. Doctor Jobling's service was marked by a conscientious efficiency which will entail a strenuous emulation if the standards set by him are upheld.

There is a large amount of material available for bacteriologic and pathologic work at the serum laboratory, but at present the time of the director and of the assistant bacteriologist is so occupied with the ordinary routine that little opportunity is afforded to engage in researches. In spite of these conditions Doctor Ruediger, assistant bacteriologist, is carrying out some most interesting and valuable experiments in connection with the preparing of plague, typhoid, and diphtheria antitoxins. With the assistance of another bacteriologist, careful records might be kept of post-mortem findings in all animals dying at the laboratory, and eventually interesting and useful data could be obtained. In the past and at the present time this is impossible.

Since the departure of Doctor Jobling the study of one problem has been completed, i. e., that of broncho-pneumonia, occurring chiefly in vaccine calves. This work was carried on by the director and Dr. Walter Sorrell, veterinarian, and it was shown that with many of the cases *B. bovisceptious* was associated.

Brief reports on several cases of yaws, one on a case of pinto or paño blanco, and one on *B. violaceus Manilae*, a pathogenic chromogenic bacillus, have been prepared by the director.

An illustrated brochure, giving in detail the methods in use in the preparation of vaccine virus at the serum laboratory will also be issued in the near future, so as to inform the general public in regard to the care and technique which this laboratory uses in preparing this material.

At the present time two peculiar skin diseases of cattle are being studied—one, the common ringworm so prevalent in the islands, the other an affection which grossly resembles actinomycosis, but which is due to an entirely different cause.

Texas fever in its typical form has not been encountered since the report which was issued earlier in the year, but several animals have died of a recrudescence of this disease which followed attacks of rinderpest and occurred during the convalescence of the animals from that disease. Lingard had a similar experience in India, and Koch in South Africa. (Am. Rept. Imp. Bacteriologist for 1902-3, Calcutta, 1903.) The reason for the flaring up of the Texas fever under these conditions is found in a diminution of resistance which is caused by the infection with rinderpest. This gives opportunity for the renewed activity of a latent infection with pyroplasmas. An analogy to this condition may be seen in cases of malaria in human beings. The fact that such cases of Texas fever have occurred in Shanghai, and the further one that pyroplasmas have been found in Hongkong (private communication from Doctor Jobling) would seem to corroborate the conclusions given in the report on Texas fever issued from this laboratory, and render more certain the fact that Texas fever must be endemic in China.[a]

[a] Bulletin No. 14, bureau of government laboratories.

In the report of Doctor Jobling reference was made to a herd of carabaos, many of which contracted surra, and which were landed for sale on the island of Negros previous to their infection. On July 9, 1904, the last of these animals imported from Shanghai by the Government were sold at public auction. From the very careful records which have been kept by inoculator Otto Schmidt, for the use of which we are indebted to Doctor Slee, chief veterinarian, some very interesting facts are established. One of these is that carabaos do not prosper when herded together. This is a confirmation of Doctor Keylock's experience in Shanghai. Our experience with carabaos show that they are very susceptible to infectious diseases if they are kept confined in large numbers, but that when given plenty of room for grazing and bathing, and plenty of work, they do well. The other important fact is that the carabao is much more resistant to surra than might have been supposed, judging from our early experience at Pasay, where so many of the animals died. It is probable that these deaths were indirectly due to close herding and directly to surra. In Negros some animals were killed after they were found to be harboring trypanosomas, but after a short experience it was found that the infection is a source of but little danger to animals which are well cared for and worked. This was so evident that in the above-mentioned island there was no difficulty even in selling infected animals. Furthermore none of those which were sold have to the present time been reported to be otherwise than in a perfectly satisfactory condition. This last fact is interesting simply in a scientific way, because the danger of spreading the infection from animals which are apparently well is no less than it would be in the cases of those in which the course of the disease is fatal. An animal which constantly may be a source of infection can have no place in any community other than one which is not only overrun with the disease, but is completely isolated from noninfected territory. Such were the conditions in Negros. Furthermore the infected animals in that island were sold by popular consent.

The breeding of small animals (rabbits, guinea-pigs, rats, and mice) has so prospered that, although the death rate is still high, the birth rate is higher. To the previous collection of small animals, chickens and pigeons have been added with every hope that they will increase and supply the laboratories with abundant experimental material.

ANTIRINDERPEST SERUM.

The following table shows the number of cattle purchased, exchanged, sold, and those that died within the period covered by this report:

TABLE I.

Month.	Purchased.	Exchanged.	Sold.	Died.
June (15-30)	16	7	4	1
July	20	11		12
August	5	30		9
Total	41	48	4	22

Value of sales and exchanges, ₱3,380.

During May and June the number of serum animals was diminished by natural causes, and at the same time it was very difficult to obtain new ones. The result was that in July and August the available supply of serum was low and all orders could not be filled immediately. Since June 15, however, a sufficient number of cattle and a sufficient quantity of serum is being produced to satisfy all demands which may be made after the 1st of October. Practically all the work involved in the preparation of this serum is under the supervision of Dr. Walter Sorrell, to whom great credit is due.

TABLE II.—*Antirinderpest serum prepared and distributed.*

Month.	Prepared.	Issued.	Returned.
June (15-30)	24,400	71,310	
July	143,550	235,700	117,690
August	170,700	160,150	30,000
Total	343,650	407,160	147,690

Amount on hand September 1, 1904, 33,065.

Experiments in preparing a desiccated serum are in progress at the present time.

TABLE III.—*Animals inoculated at the serum laboratory and amounts of virulent blood and serum used.*

Month.	Inoculated with blood.	Amount of blood.	Inoculated with serum	Amount of serum.
		cm³.		cm³.
June (15-30)	19	14,115	11	1,100
July	112	60,421	94	35,905
August	94	41,360	124	11,650
Total	225	115,896	229	48,655

For the reasons given by Doctor Jobling in his special report no "simultaneous" inoculations have been used, the method being that described by him.

At times there have been virulent blood cattle on hand more than was necessary for the purpose for which they were intended, and it was thought advisable to attempt to save these animals for serum purposes. Accordingly Doctor Sorrell instituted the method of using large amounts of serum intravenously. By carrying out this procedure, using from 150 to 500 cm³. of serum, the majority of the animals have been saved, where they have been taken in the early stages of the disease. The curative properties of the serum, as well as its prophylactic qualities may therefore be considered as proven.

TABLE IV.

Number of animals.	Amount of serum used (each).	Number cured.	Number died.
	cm³.		
3	150	3	
6	200	4	2
5	300	5	
2	500	1	1
16		13	3

NOTE.—All these animals which are reported dead succumbed to Texas fever during convalescence.

The following table shows the number of examinations of smears of blood for surra.

TABLE V.

Month.	Number examined.	Number positive.
June (15-30)	1	1
July		
August	8	4
Total	9	5

SURRA IN CARABAOS.

TABLE VI.—*Number of animals in the Negros herds of government carabaos.*

Herd.	Number.	Died.	Mortality.
			Per cent.
D	192	53	27.60
Negros	50	19	38.00
Manila	149	70	46.90
Total	391	142	36.57

TABLE VII.—*Cause of death.*

Cause.	Herd D.	Negros.	Manila.	Total.
Malignant catarrh	35			35
Exhaustion or debility	3	2	2	7
Surra (died or killed)	14	18	58	90
Pneumonia			1	1
Septicemia	1			1
Accidents			8	8
Total	53	20	68	142

TABLE VIII.—*Number of animals sold, returned after sale, and died after return.*

Sold	250
Returned because of surra	5
Died after return	1

Of the 5 animals returned 3 were resold.

TABLE IX.—*Number of animals in each herd whose blood contained trypanosoma before sale and after sale, and the number of deaths after sale.*

Herd.	Positive before sale.		Positive after sale.	Deaths after sale.
	Number.	Per cent.		
D	22		40	9
Negros	47	94.0		
Manila	121	81.2		3
Total	190		40	12

TABLE X.—*Day after landing upon which parasites were found in the blood of each animal.*

Day.	Herd D.	Negros.	Manila.	Total.	Day.	Herd D.	Negros.	Manila.	Total.
Third			22	22	Thirty-ninth		15		15
Fifth			2	2	Fortieth	1	3		4
Eleventh			30	30	Forty-first		7		7
Sixteenth	1		30	31	Forty-second	2			2
Seventeenth			18	18	Forty-third	3			3
Eighteenth			1	1	Forty-fourth	4	1		5
Twentieth			3	3	Forty-sixth		1		1
Twenty-first			2	2	Forty-eighth	2			2
Twenty-second	2		3	5	Fiftieth	1	2		3
Twenty-third			3	3	Fifty-second	3	1		4
Twenty-sixth			5	5	Fifty-third	1			1
Twenty-seventh	1			1	Fifty-fourth	3			3
Twenty-eighth	5			5	Fifty-fifth	6			6
Twenty-ninth			1	1	Fifty-sixth	1			1
Thirtieth	1			1	Fifty-ninth	13			13
Thirty-second	3		1	4	Sixty-third	1			1
Thirty-fifth		17		17	Sixty-fifth	8			8

Total, 231.

VACCINE VIRUS.

Since June 15, 1904, Mr. W. D. Cheek has had charge of this work under the supervision of the director. All the bacteriologic examinations have been made by the latter. This year enough vaccine has been prepared to supply all needs during the hot season, so that few animals were used during that time. The close of the unusually warm weather has been so irregular, both as to temperature and moisture, that inconstant yields have been collected from vaccinated calves. This state of affairs has been experienced in past years, and was to be expected.

During July some unfavorable reports were received regarding the vaccine, and in certain cases the bad results were traceable to a stock of vaccine that had been treated with an

antiseptic. In other cases the results were undoubtedly due to a lack of proper facilities for preserving the virus after it had left the laboratory.

The laboratory records show 22 per cent of takes in secondary cases, and also show that one stock virus after eight months in the ice box was active.

TABLE XI.—*Number of calves purchased, obtained by transfer, vaccinated, the number from which virus was collected, and the number sold.*

Month.	Purchased.	Exchanged.	Vaccinated.	Number from which virus was collected.	Sold.
June (15–30)			5	5	
July	9	16	16	13	25
August	14	[a] 20	39	35	5
Total	23	36	60	53	30

[a] Twenty-eight delivered in exchange; total, 48; value of exchange, ₱1,138.

Several adult serum animals are also included in this table.

TABLE XII.—*Amount of vaccine virus prepared and issued.*

Month.	Prepared.	Issued.
June (15–30)	50,000	73,800
July	186,500	246,900
August	353,000	267,850
Total	589,500	588,550

On hand September 1, 1904, 650,740.

PLAGUE PROPHYLACTIC.

The manufacture of plague prophylactic has been in the complete charge of Dr. E. H. Ruediger since June 15, 1904, and he is engaged in the preparation of the materials, using the methods of Shiga, Haffkine, and Lustig.

TABLE XIII.

Month.	Haffkine.	
	Prepared.	Issued.
	cm^3.	cm^3.
July	3,000	3,000
August	3,900	3,900
Total	6,900	6,900

On hand September 1, 1904, 8,536 cm^3.

PLAGUE SERUM.

Under the supervision of Doctor Ruediger several horses are being prepared for the production of antiplague serum.

MALLEIN.

No mallein has been prepared in the period covered by this report, enough remaining on hand. All of this material is thoroughly tested, before it is distributed, upon healthy and glandered horses furnished by the chief veterinarian of the board of health.

OTHER PRODUCTS.

Arrangements are now being made in order to supply tetanus antitoxin and rabies virus. Doctor Kitasato, of Tokyo, has had the kindness to furnish materials for this work.

Rinderpest. Animal No. 542.

Record of Variations of Temperature beginning July 25 *, 1904 , at the Serum Laboratory, Manila, P. I.*

KIND OF ANIMAL.	HEIGHT.	WEIGHT.	AGE.	COLOR.	SEX.	NATIVITY.		PRICE.
Cow	47"	650	7 yrs.	Red	F	Shanghai	I. P. A. 403.	

I. CHART SHOWS THE PRIMARY ATTACK OF RINDERPEST CONTROLLED BY USE OF ANTERINDERPEST SERUM, WITH THE LATER RISE OF TEMPERATURE, FOLLOWED BY DEATH.

The autopsy showed the typical lesions of Texas fever, and smears from the spleen showed the parasites. In this case the rinderpest was undoubtedly in the third or fourth day when the animal reached the laboratory.

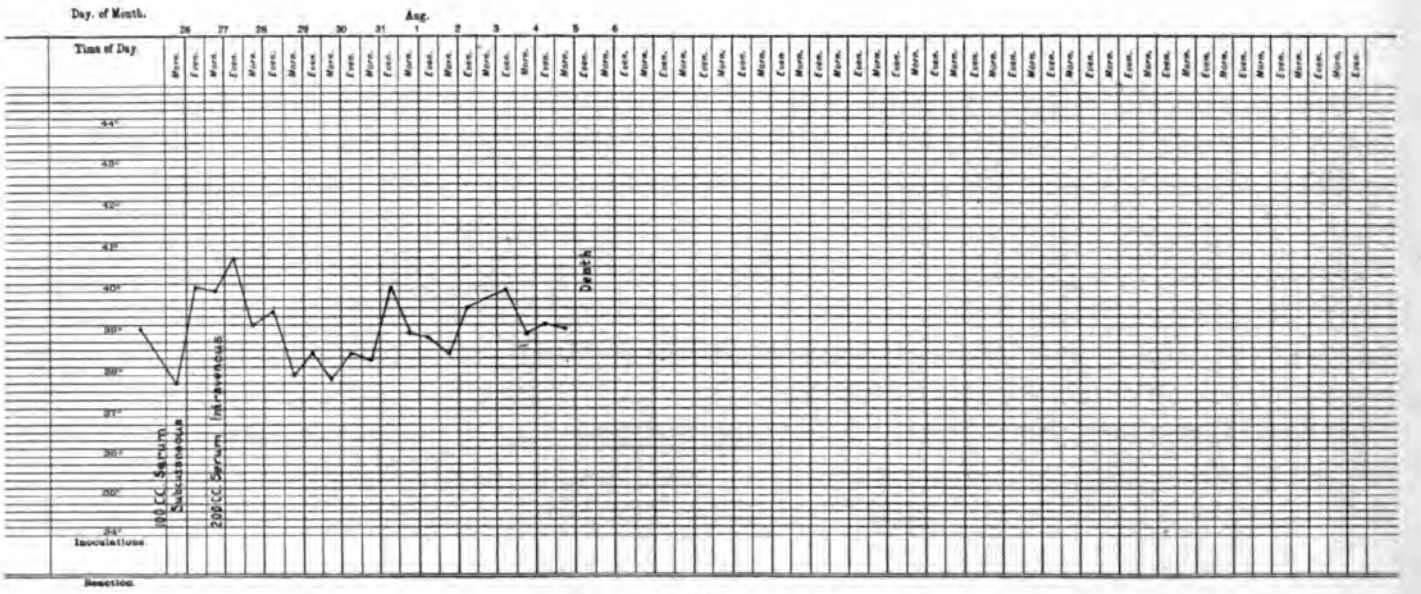

Day. of Month.
Aug.
26 27 28 29 30 31 1 2 3 4 5 6
Time of Day
Morn. Even.
44°
43°
42°
41°
40°
39°
38°
37°
36°
35°
Inoculations
Resection.
10 C.C. Serum Subcutaneous
20 C.C. Serum Intravenous
Death

CHART I.

Rinderpest. Animal No. 554

Record of Variations of Temperature beginning July 25 *, 1904 , at the Serum Laboratory, Manila, P. I.*

KIND OF ANIMAL.	HEIGHT.	WEIGHT.	AGE.	COLOR.	SEX.	NATIVITY.		PRICE.
Steer	51″	850#	12 yrs.	Red	M	Shanghai	I. P. A. 419.	

II. CHART SHOWS RECORD OF AN ATTACK OF RINDERPEST CONTROLLED BY THE USE OF SERUM.

When compared with a milder attack, and one not treated by the intervenous method, the difference in the curve will be marked, and especially the rapid fall of the temperature.

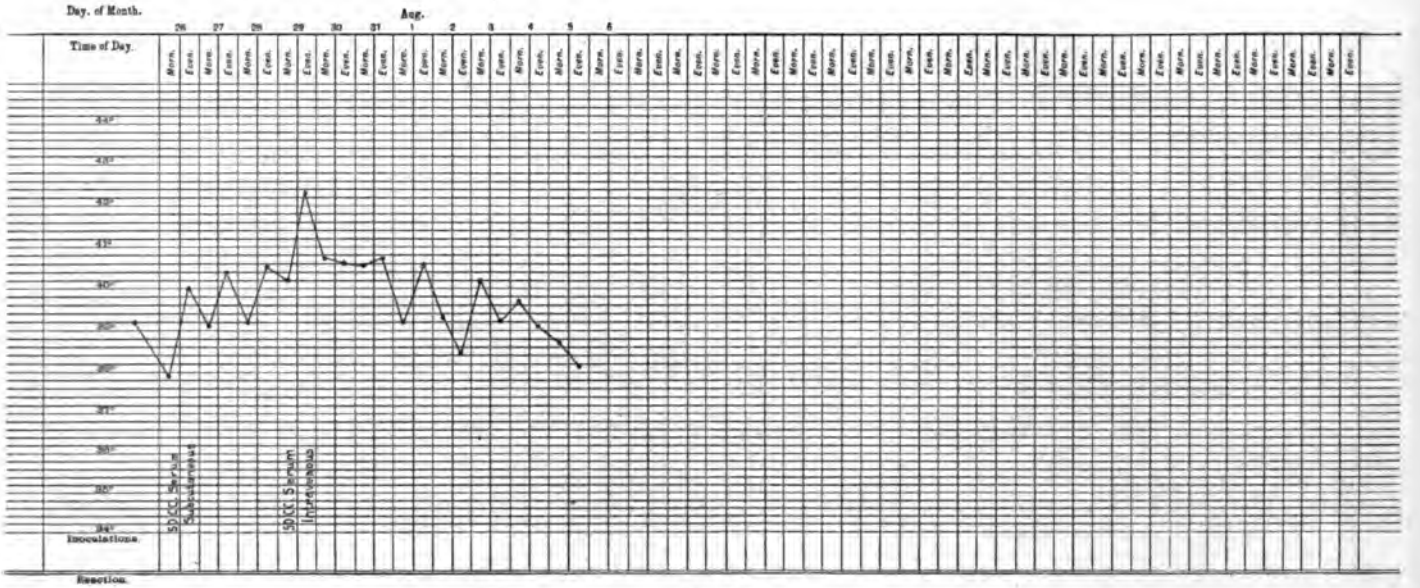

Day. of Month.
Aug.
26
27
28
29
30
31
1
2
3
4
5
6
Time of Day.
Morn.
Even.
42°
41°
40°
39°
38°
37°
36°
35°
34°
Inoculations.
Reaction.
10 CC. Serum
Subcutaneous
10 CC. Serum
Intravenous

CHART II.

Rinderpest. Animal No. 555.

Record of Variations of Temperature beginning July 25 *1904 , at the Serum Laboratory, Manila, P. I.*

KIND OF ANIMAL.	HEIGHT.	WEIGHT.	AGE.	COLOR.	SEX.	NATIVITY.		PRICE..
Steer	51"	850#	9 yrs.	Dark Red	M	Shanghai	I. P. A. 382.	

III. A COMPARISON CHART TO SHOW THE SAME THINGS INDICATED ON CHART II.

Rinderpest. Animal No. 549

Record of Variations of Temperature beginning July 25 *, 1904 , at the Serum Laboratory, Manila, P. I.*

KIND OF ANIMAL.	HEIGHT.	WEIGHT.	AGE.	COLOR.	SEX.	NATIVITY.		PRICE.
Steer	44"	800#	10 yrs.	Red	M	Shanghai	I. P. A. # 340.	

IV. CHART SHOWS THE PROGRESS OF AN ATTACK OF RINDERPEST MODIFIED BY THE TIMELY USE OF SERUM.

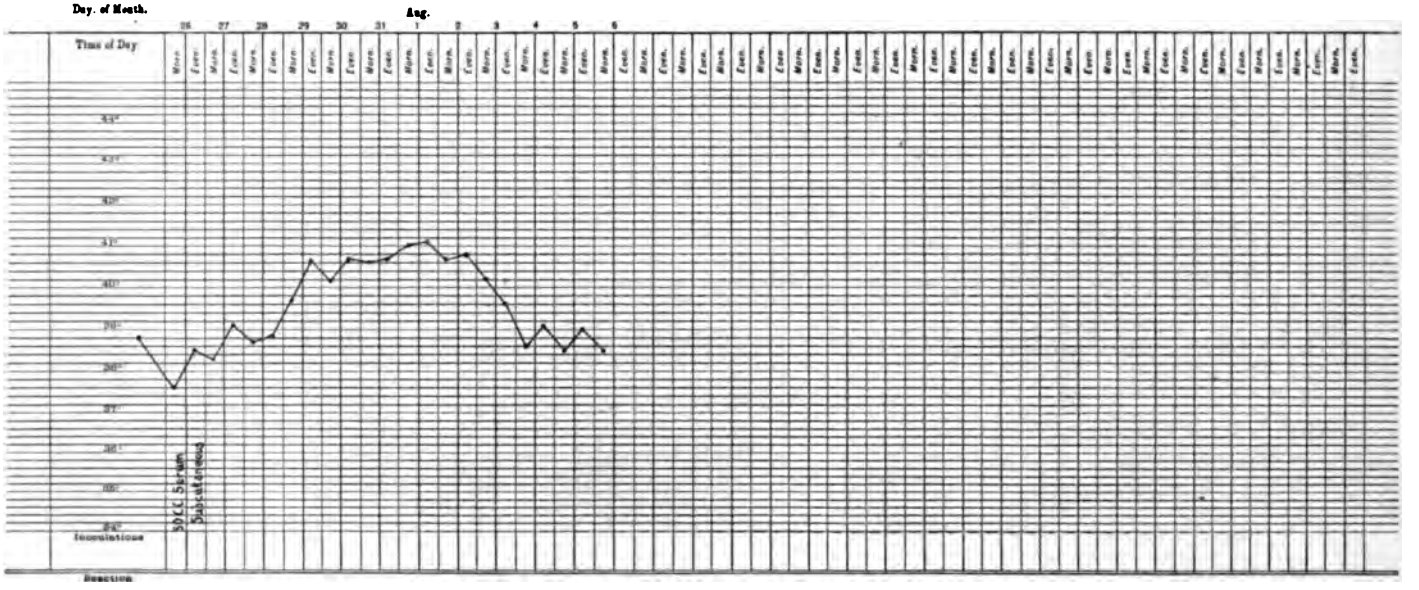


CHART IV.

Rinderpest. Animal No. 538

Record of Variations of Temperature beginning July 25 *1904, at the Serum Laboratory, Manila, P. I.*

KIND OF ANIMAL.	HEIGHT.	WEIGHT.	AGE.	COLOR.	SEX.	NATIVITY.		PRICE.
Cow	46"	500#	4 yrs.	Red & White	F	Shanghai	I. P. A. 418.	

V. CHART TO SHOW THE SAME THINGS AS CHART IV.

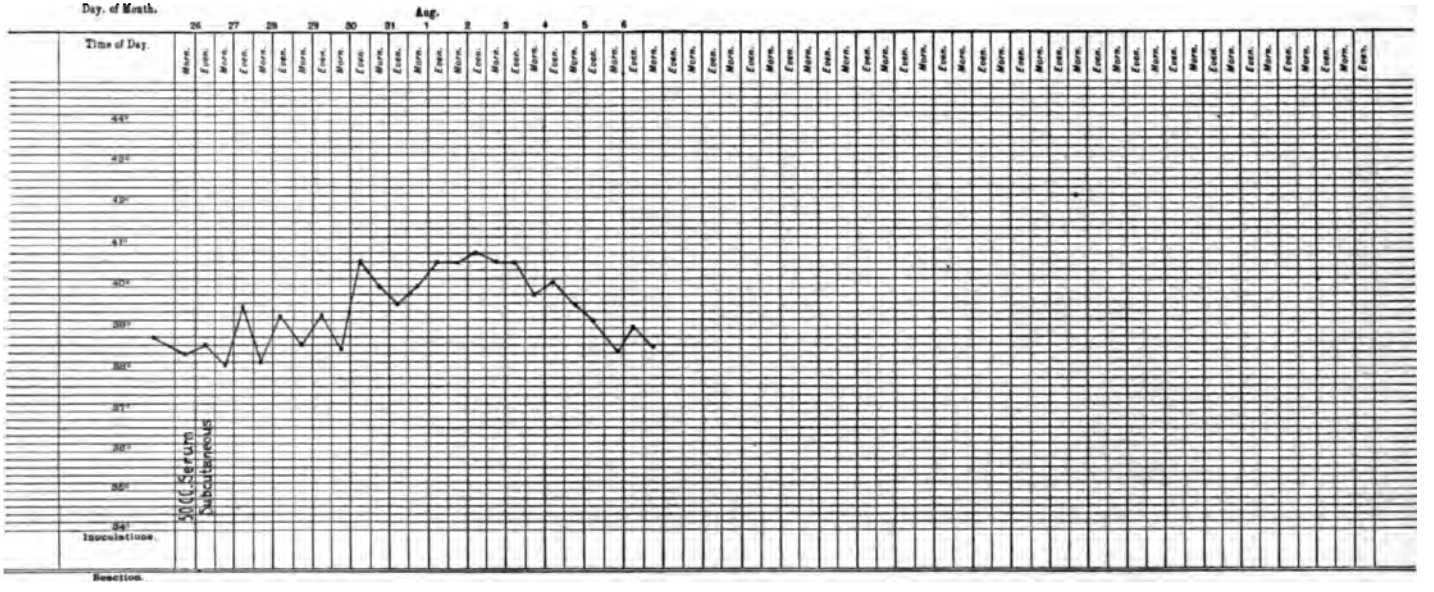

Day. of Month.
Aug.
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1
2
3
4
5
6
Time of Day.
Morn.
Even.
44°
43°
42°
41°
40°
39°
38°
37°
36°
35°
34°
30 C.C. Serum Subcutaneous
Inoculations.
Reaction.

CHART V.

EXHIBITS.

I.—A temperature chart of an animal dying of Texas fever in its convalescence from rinderpest. Shows the effect of the use of serum given intravenously in large doses even when the disease is found in the third and fourth day.
II and III.—Charts showing the effects of intravenous injection of serum in uncomplicated cases of severe rinderpest.
IV and V.—Charts showing the effects of small subcutaneous doses of serum in uncomplicated rinderpest.

REPORT OF MR. ELMER D. MERRILL, BOTANIST.

Botanical investigations, under the auspices of the insular government, were first instituted in the bureau of agriculture at the time of its organization, in April, 1902. The position of botanist was solely within that bureau until July, 1902, when it was extended so as to cover the needs both of the bureaus of agriculture and forestry. This unsatisfactory arrangement continued until July, 1903, when the botanist and the botanical equipment were transferred to the bureau of government laboratories, and by this action laboratory work in this branch of science was placed on the same plane as that of the others, and, following out the plan of organization of this bureau, all departments of the government are now at liberty to request the assistance of the laboratories in this line of work. Later in the year another systematic botanist, Dr. E. B. Copeland, and two botanical collectors, Mr. A. D. E. Elmer and Dr. H. N. Whitford, were appointed, so that the botanical staff now includes four men.

There has been no radical change in the general character of the botanical work, the greatest amount of attention during the past year having been given to increasing the herbarium, in order to enhance its value as a reference collection, and in Manila the endeavor has been to identify the material as far as possible, because of the relationship which other lines of botanical research bear to systematic botany. As the work develops, other branches will be given prominence, Doctor Copeland, who is now a member of the force, being especially fitted to undertake work on vegetable physiology, although up to the present he has devoted himself to the study and classification of the vascular and cellular cryptogams of the Philippine flora. Doctor Whitford is prepared to undertake work along ecologic lines as soon as he obtains a working knowledge of the characteristic species of the Philippine flora, while Mr. Elmer is well fitted for herbarium work, so that, at intervals, when he is in from collecting trips, his services can be utilized to advantage.

HERBARIUM.

At the time of the transfer to the bureau of government laboratories in July, 1903, the herbarium contained 5,061 mounted specimens, while at the present date it has 10,989 mounted ones, 5,928 mounted sheets having been added during the past year. Much material collected during that time is not included in the present report, as the opportunity to prepare it for the herbarium has been lacking. Of the 10,989 mounted sheets in the herbarium, 8,928 are of Philippine material and 2,061 are of foreign origin, they having been received in exchange from various institutions, chiefly situated in the Malayan and southern Asiatic regions.

The 5,928 specimens added to the herbarium in the past year have been received from the following sources:

FOREIGN.

Received from the 's Lands Plantentuin, Buitenzorg, Java, duplicates of plants cultivated in the botanical garden	126	
Received from J. C. Willis, director of the Royal Botanical Garden, Perideniya, Ceylon, duplicates of Ceylon plants	62	
Received from the United States Department of Agriculture, Washington, D. C., duplicates of grasses from the Southern United States	30	
		218

PHILIPPINE.

Collection of Elmer D. Merrill, provinces of Bataan, Pampanga, Rizal, Tarlac, Tayabas, and Camarines Sur, Luzon, and from the islands of Mindoro and Masbate.	989
Collection of Dr. E. B. Copeland, province of Bataan, Luzon, districts of Davao, Cottabato, and Zamboanga, Mindanao, and from the islands of Calignan, Bayas, Panay, and Negros	1,360
Collection of A. D. E. Elmer, provinces of Union and Benguet, Luzon	1,120
Collection of H. N. Whitford, province of Bataan, Luzon	537

Received from the forestry bureau, collected by:		
J. W. Ritchie, Guimaras Island	24	
W. H. Ware, province of Tayabas, Luzon	25	
P. T. Barnes, province of Bataan, Luzon	306	
J. A. Gammill, Guimaras Island	140	
W. Klemme, province of Tayabas, Luzon	26	
G. S. Van Wickle, province of Camarines Sur, Luzon	21	
C. H. Bath, province of Tayabas, Luzon	3	
W. M. Maule, province of Zambales, Luzon	30	
T. E. Borden, province of Bataan, Luzon	219	
E. Hagger, province of Tayabas, Luzon	10	
Mariano Ramos, province of Rizal, Luzon	96	
		900
Received from the Philippine exposition board 1 set of duplicate material of the following collections:		
H. Hallier, provinces of Laguna and Zambales, Luzon; Zamboanga, Mindanao, and island of Basilan	773	
DeVore and Hoover, island of Basilan, and district of Davao, Mindanao	382	
Leon Guerrero, province of Rizal, Luzon	42	
Miscellaneous material	45	
		1,242
Miscellaneous unnumbered material of various collectors		36
Collection of J. V. Barrow, Cebu, for identification		32
Collection of Luther Parker, Bacolor, Pampanga, for identification		79
Total		6,513

IDENTIFICATION OF BOTANICAL MATERIAL.

During the past year a large percentage of the material which has been received has been identified in this office, for as yet but little aid has been given from outside sources. Dr. V. F. Brotherus, of Helsingfors, Finnland, has favored us with the identification of 25 species of Philippine *Musci*, from my own collection, but no other direct identifications have been received, although much material has been dispatched to various specialists and institutions. During the previous fiscal year 2,302 specimens of Philippine plants were sent to the Botanical Garden, Berlin, Germany, as at that time Dr. J. Perkins was employed by the Carnegie institution for botanical investigations on the Philippine flora at Berlin, and accordingly it was expected that at least a partial list of the identification of this material would be furnished at an early date, but so far the only ones received from this source have consisted of about 300 numbers cited by Doctor Perkins and her collaborators in the first fascicle of her Fragmenta Floræ Philippinæ, published in February, 1904. It is to be presumed that many more specimens of the collection have been identified and that the results will be noted in future fascicles of this work. As the herbarium increases the library is made more complete, and as the employees of this office acquire a more intimate knowledge of the Philippine flora, a very much larger percentage of identification can be made.

In addition to the work of this office a considerable amount has been done for other bureaus and persons. Approximately 890 specimens have been identified for the forestry bureau, 103 for the bureau of agriculture, 265 for Dr. J. G. Coulter, teacher of botany in the Philippine normal school, and about 150 identifications for various persons who have submitted material. In many cases it is quite impossible to identify specimens in Manila, and this is especially true in the case of critical families and genera, while with others we have not the literature available for the study of certain groups, and hence it will for some time to come be necessary to send much duplicate material to various specialists in Europe and America. Arrangements already have been entered into with several such investigators in various groups looking to the identification of our Philippine material, and already much has been sent away.

EXCHANGE AND DISTRIBUTION OF DUPLICATE BOTANICAL MATERIAL.

The collection of duplicate material in the office is at the present time a very extensive and valuable one, and it serves several purposes. One is that material collected in duplicate gives us a very full series of specimens of the same plant for study, and hence some idea of the variation in any given species; another, that such a collection affords us sufficient material to enable us to send a considerable quantity to specialists in America and Europe for identification in critical families and genera, or, when it becomes necessary, for comparison with types in European herbaria. Again, the collection gives us much valuable material which can be offered in exchange to various botanical institutions in the Tropics

of the East. All collectors receive instructions to secure in abundance material representing each species, when the circumstances admit of its preparation and preservation. The first set is deposited in the herbarium of the bureau; the remainder is poisoned with corrosive sublimate and preserved in a separate collection until desired for distribution or exchange.

The following duplicate material has been distributed during the past year:

	Specimens.
United States National Herbarium, Washington, D. C.	2,155
New York Botanical Garden, Bronx Park, New York	1,055
Royal Botanic Garden, Calcutta, India	607
Gray Herbarium, Cambridge, Mass.	875
Philippine exposition board, St. Louis Purchase Exposition, St. Louis, Mo.	515
Missouri Botanical Garden, St. Louis, Mo	355
Botanisches Museum und Laboratorium für Waarenkunde, Hamburg, Germany	456
Total	6,018

With the exception of 1,055 specimens sent to the New York Botanical Garden and 1,017 sent to the United States National Herbarium, which were duplicates of plants received during the past year from the 's Lands Plantentuin, Java, all the other materials were from my personal collection. In addition to the ones enumerated above, 25 specimens of Philippine mosses were sent to Dr. V. F. Brotherus, Helzingfors, Finnland, and all the mounted material and duplicates of 70 numbers of the Orchidaceæ were sent to the Ames Botanical Laboratory, North Easton, Mass., for identification, while at the request of Dr. C. S. Sargent, director of the Arnold Arboretum, Jamaica Plain, Mass., all the material of the genus *Pinus* (20 sheets) was loaned to that institution to aid Doctor Sargent in his special studies.

In order to prevent future confusion in the work on Philippine systematic botany, the policy of distributing only identified duplicates has been adopted, except in those cases where it has become necessary to send specimens abroad for identification, and then, so far as possible, all the available duplicates are supplied. The following plan has been found satisfactory, both to this office and to those to whom material has been sent: All the available material, including the specimen mounted for this herbarium, as well as all duplicates and notes are supplied, in order that the investigator may have a full series with which to work. When the identifications are completed one duplicate is retained by the specialist for his own collection, while the remainder is returned to this office for distribution.

BOTANICAL MATERIAL FROM OUTSIDE SOURCES.

Little botanical material has been received during the past year from outside sources, but arrangements for exchange have been made with the following institutions and persons: The Royal Botanic Garden, Calcutta, India, for plants of tropical Asia and the Malayan region; the 's Lands Plantentuin, Buitenzorg, Java, Javanese plants; Botanic Garden, Sydney, New South Wales, Australian plants; C. A. Barber, government botanist, Madras, British India, Indian plants; the Hamburg Museum, for duplicates of the collection of Dr. H. Hallier from the Philippines, Marianne Islands, Singapore, etc.; A. Usteri, Zurich, Switzerland, Philippine plants; the Field Columbian Museum, plants of tropical America; the newly established agronomic station in Cuba, Cuban plants; the New York Botanical Garden, Philippine plants collected by Mr. R. S. Williams.

Correspondence has been opened with other institutions in order to secure more exchanges of botanical material, and doubtless satisfactory arrangements will be entered into.

While I was still botanist in the bureau of forestry I submitted a plan to the chief of that bureau, giving the details of a proposed distribution of duplicate botanical material to the several forestry schools of the United States, and this plan has been in operation since my transfer to the bureau of government laboratories, material being drawn from the collections made by the employees of this and of the forestry bureau. The material is distributed under the title of "Decades of Philippine forest flora," each specimen being provided with a printed label giving the scientific and native names, the general distribution, the value and uses of the several species, and other data of importance. The first ten decades at the present time are about ready for distribution, about 10 full sets of each species being prepared, and a continuation of the work is contemplated. It is believed that this material will aid students of forestry in the various schools of the United States and will especially be advantageous to those who plan to enter the Philippine forestry service, the material supplied being such as will give students an opportunity of becoming acquainted with the botanical characters of the most important Philippine timber trees.

WORK FOR THE PHILIPPINE EXPOSITION BOARD.

Work undertaken for the Philippine exposition board during the preceding year was continued, and it called for more or less of my time and attention up to April, 1904, when the last of the botanical material destined for the St. Louis Purchase Exposition was forwarded to the Philippine exposition board at St. Louis. The work included the examination and identification of several thousand specimens of woods, fibers, medicinal plants, fruits, seeds, and botanical specimens, the latter being mounted and prepared for exhibit in this office. A chapter on Philippine botany was prepared for the official catalogue of the Philippine exhibit, and an appendix, giving a list of the Philippine timber trees, with native and scientific names, with the uses of the wood so far as known, was added. Additions, changes, and corrections in the same publication were made by the botanist in the chapters on forestry and agriculture.

The collection from the island of Basilan, and from Davao, Mindanao, of Messrs. De Vore and Hoover, two American school-teachers employed for three months by the board for the purpose of collecting botanical material, was turned over to me for identification and mounting. It contained 382 numbers, one set of which was mounted and partly identified for the exposition board, and one was deposited in the herbarium of this bureau. All other duplicates were returned to the exposition board. The small collection of Dr. Leon Guerrero, 42 specimens, was treated in a like manner. On December 1, 1903, Dr. H. Hallier received a temporary appointment of three months to make botanical collections for the exposition board and the work was placed under my direction. The time occupied by Doctor Hallier was three months, during which time he collected in the provinces of Laguna and Zambales, Luzon the island of Basilan, and the district of Zamboanga, Mindanao, in all, 773 numbers. This material was arranged and the preliminary identifications were made in this office, the final disposition being one set to the Philippine exposition board at St. Louis, one to the herbarium of this bureau, and one retained by Doctor Hallier for the Hamburg Museum, Hamburg, Germany.

In addition to the material from the collections of De Vore and Hoover, Hallier, and Guerrero, 515 specimens, duplicates of my own Philippine collection, were mounted, identified, arranged in families and genera, and sent to the exposition board as a portion of the exhibit of this bureau.

PUBLICATIONS.

During the past year the following papers on botanical subjects have been issued by this bureau: New or Noteworthy Philippine Plants, I, and the American Element in the Philippine Flora (publication No. 6 of the bureau). The first article contains descriptions of 11 new species of Philippine plants and notes on many others of especial interest; the second is an enumeration and discussion of the many species of plants of American origin now found in the Philippines. A Dictionary of the Plant Names of the Philippine Islands (publication No. 8 of this bureau) consists of an enumeration of all the known native plant names in use in the Philippines, with their Latin equivalents, this bulletin having been compiled especially for the use of the employees of the bureau of forestry. The following publications have recently been submitted: New or Noteworthy Philippine Plants, the second paper of the series, containing the descriptions of 60 new species, and A Review of the Identifications of the Species of Blanco's "Flora de Filipinas," prepared especially with reference to the identification of Blanco's unknown or imperfectly known species, with the view of aiding collectors in securing material which may assist in the identification of the latter. In addition to the above publications, which have been prepared by myself, Dr. E. B. Copeland has submitted for publication a paper entitled "Edible Philippine fungi, with diagnoses of new species." Doctor Copeland at the present time is employed in the investigation of certain problems regarding the growth of the cocoanut tree in relation to the production of copra, and also in the study of Philippine vascular and cellular cryptogams. Doctor Whitford, in conjunction with his work as a collector, is giving special attention to ecological matters, with a view to future publications on the subject, while my own work is very largely of a systematic nature, the present rapid growth of the herbarium making this imperative.

WORK ON THE PHILIPPINE FLORA DONE BY OTHER INSTITUTIONS AND INDIVIDUALS.

The New York Botanical Garden has maintained in the field for nearly a year a collector, Mr. R. S. Williams, who has made extensive and valuable collections in the provinces of Bataan and Benguet. Dr. H. Hallier, of the Hamburg Museum, in the early part of the past year was in southern Luzon. He then left the islands and returned later to collect for three months both for the Philippine exposition board and the Hamburg Museum. Duplicates of all of the latter collection are deposited in this bureau, and arrangements have been made to secure the other material. Maj. E. A. Mearns has done some work in Mindanao,

the results of which he has sent to the United States National Museum, while several schoolteachers and other American residents in the Philippines have shown a marked interest in Philippine botany. Collecting outfits have been furnished to several, and considerable valuable material has already been received from this source.

LAMAO.

At the request of the chief of the bureau of forestry especial attention has been given to the investigation of the flora of the Lamao River basin, province of Bataan, Luzon, where a reserve for the purpose of investigating the forestry conditions of the Philippines has been established, and at different times during the past year Doctors Copeland, Whitford, and I have made collections at Lamao, and the same has been done by Messrs. Barnes and Borden, of the forestry bureau. In the office much time has been given to the identification of this material and a preliminary list of the flora of the Lamao River basin has been given the chief of the bureau of forestry for his information.

One of the most important undertakings inaugurated at Lamao is the establishment of the so-called "type areas" at different altitudes in the forest, on plans outlined by me for the chief of the forestry bureau, the work in the field being commenced by Mr. Barnes and continued by Mr. Borden. These "type areas" consist of typical forest regions of a known size, in which all the trees are labeled and numbered, botanical material being collected from each individual, regardless of its condition as to fruit or flower. After the first collection is made each tree is examined from time to time until complete material, consisting of fruit, flowers, and leaves is secured from all. The investigation of these "type areas," if properly carried out, will give us much valuable and interesting information as to the constituents of the Philippine forests, the relative predominance of species of economic importance, the rate of tree growth and reproduction, the periods of flowering, shedding of leaves, etc.

GENERAL RECOMMENDATIONS.

At the present time the botanical work can not be considered as organized, and no definite policy has been adopted regarding its scope or in what direction its chief development should be. There are now seven employees assigned to the botanical work, and in order to avoid confusion it is respectfully recommended that the botanical work be organized as a distinct laboratory, just as is the case with the other laboratories of the bureau; that a director of the laboratory be appointed, and that he shall have oversight over the other employees in the botanical work, under the general supervision of the chief of the bureau.

In order to make the results thoroughly representative, the work along certain lines should be developed. The most important subject to be considered is the establishment of a botanical garden under the direction of this bureau, attention having been called to the importance of such an institution in my previous reports. If it is the plan of this bureau to attract foreign botanical investigators to this laboratory, it is essential that provision be made for the establishment of a thoroughly equipped and representative botanical garden, for no matter how well the laboratory may be supplied with apparatus, books, and collections, American and European botanists will not select Manila as a locality for their investigations until a thoroughly equipped botanical garden is established as a source from which they can draw material for their investigations. Under proper cooperation it is possible that a satisfactory botanical garden could be developed at Lamao, in connection with the forest reserve, but the question of its accessibility is a very important one; the difficulty of reaching it from Manila, although the natural conditions are apparently well suited to the purpose, is an objection which should be overcome by the acquisition at least of some territory nearer the laboratory.

REPORT OF MR. CHARLES MARTIN, PHOTOGRAPHER.

The total number of prints made during this period is as follows: 5 by 7, 3,000; 8 by 10, 800; 11 by 14, 400.

During February of 1904 the laboratory was supplied with a complete Zeiss photomicrograph camera and apparatus, and since that time a large number of photomicrographs have been taken, some of very great magnification, with very good results. Unfortunately at present the apparatus is placed on a wooden floor, so that some vibration occurs. This defect will be obviated in the new building, where it is to be placed upon a stone pier mounted from the ground.

The civil hospital having obtained an apparatus which is properly equipped for radiography, about 35 skiagraphs were taken during the past year.

The photographer has been on several expeditions outside of Manila. The first of these to Benguet over the new road was undertaken in the early months of 1904, and 120 negatives showing the work upon this highway and 28 enlargements of some of these views were made. During the months of June, July, and August the photographer conducted an expedition to northern Luzon for the purpose of photographing the wild tribes of that region. Seven hundred and fifty negatives were taken, 500 of which were developed in the field under the most adverse conditions of weather. Five minor expeditions for the purpose of photographing the methods of rice culture and of threshing were made during 1904.

The negatives of the bureau of government laboratories are now being arranged and sorted and prints from each deposited in an album belonging to the bureau. After this work is completed the negatives will be numbered and the corresponding number placed upon the print in the album. When this is done the process of finding a given negative will be much simplified.

SUMMARY OF WORK PERFORMED.

Statement of cash received by the bureau of government laboratories during the fiscal year ending June 30, 1904.

Month.	Local currency.	Philippine currency.
1903.		
July	$1,802.00	₱794.30
August	27.00	28,114.62
September	48.00	70.68
October	205.40	1,290.43
November	135.00	767.31
December	78.00	1,013.12
1904.		
January	9.12	570.10
February	8.84	1,588.61
March	27.68	2,566.23
April	27.84	522.95
May	7.72	222.80
June	5.09	2,576.92
Total	2,381.69	40,098.07

Statement of vaccine virus and rinderpest serum issued to board of health for the fiscal year 1904.

[Philippine currency.]

Month.	Vaccine virus.	Rinderpest serum.
1903.		
July	₱2,379.50	₱4,350.00
August	1,440.74	5,940.00
September	2,156.50	4,665.00
October	1,034.80	8,220.00
November	1,593.00	10,515.00
December	3,455.00	8,585.00
1904.		
January	4,328.00	6,165.00
February	6,741.00	1,125.00
March	6,532.00	1,980.00
April	6,064.00	4,500.00
May	6,944.00	5,175.00
June	4,881.00	8,640.00
Total	47,549.54	69,860.00



FORMER TEMPORARY BIOLOGICAL LABORATORY ON CALLE ALIX.





GAS TANKS, NEW LABORATORY BUILDING.



INTERIOR OF A WORK IN THE BIOLOGICAL LABORATORY. NEW LABORATORY BUILDING.



INTERIOR OF THE COMMERCIAL LABORATORY, NEW LABORATORY BUILDING, SHOWING STILLS AND EXTRACTION APPARATUS.

SUMMARY OF WORK PERFORMED—Continued.

Statement of work performed for the various bureaus of the government for the Philippine Islands during the six months ending December 31, 1903.

[Local currency.]

Bureau.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Civil hospital	$698	$1,079	$1,046	$1,056	$943	$570	$5,392
Exposition board	323				20		343
Bureau of public instruction				15	360		375
Bureau of public printing	50						50
Custom-house	47	50	67	178			342
Benguet road	1						1
Settlement house	3		6				9
Board of health	4,321	6,522	4,362	5,952	4,665	3,450	29,272
Bilibid prison	38	58	18	84	39	9	246
Improvement of the port						100	100
Bureau of agriculture	700	1,150	3	240	150	360	2,603
Mining bureau					90		90
Ethnological survey			30				30
Forestry bureau				258	360		618
Total	6,181	8,859	5,532	7,783	6,627	4,489	39,471

Statement of work performed for the various bureaus of the government for the Philippine Islands during the six months ending June 30, 1904.

[Philippine currency.]

Bureau.	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.
Civil hospital	₱547.00	₱719.44	₱857.00	₱919.00	₱771.00	₱785.00	₱4,598.44
Bureau of public instruction	312.00			10.08			322.08
Custom-house	218.00	263.00	295.00	576.50	283.00	225.00	1,860.50
Benguet road		15.00					15.00
Settlement house			3.00			18.00	21.00
Board of health	4,670.70	4,535.00	3,493.00	4,871.00	5,058.20	4,054.00	26,681.90
Bilibid prison	60.00	93.00	387.00	333.00	105.00		978.00
Bureau of agriculture	22.16	124.32	350.00			30.00	526.48
Mining bureau		165.00		180.00	160.00	24.00	529.00
Ethnological survey	140.46	34.00	301.42		2.40		478.28
Forestry bureau	225.00	60.00	50.00		54.00		389.00
Secretary of the interior	3.12	8.20	129.00				140.32
Civil governor	3.12						3.12
Bureau of architecture	10.00						10.00
Government carabaos	2,695.00	116.00	1,852.00	527.00		267.00	5,757.00
Insular treasurer		40.00			100.00		140.00
Insular purchasing agent		5.00	95.00	50.00	105.00		255.00
Civil sanitarium			25.00				25.00
Bureau of engineering				110.00			110.00
Consulting engineer				30.00			30.00
Coast and geodetic survey				5.00	32.00		37.00
Civil-service board				6.00			6.00
Coast guard and transportation					25.00	25.00	50.00
Marine hospital and quarantine						3.00	3.00
Total	8,908.56	6,477.96	7,837.42	7,617.58	6,695.60	5,431.00	42,966.12

APPENDIX K.

REPORT OF THE CHIEF OF THE BUREAU OF PUBLIC LANDS.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PUBLIC LANDS,
Manila, September 1, 1904.

SIR: I have the honor to make the following report of the operations of this bureau from September 1, 1903, to August 31, 1904, both dates inclusive.

PUBLIC LANDS.

The rules and regulations required to be prepared by the government of the Philippine Islands, in accordance with the provisions of section 13 of the act of Congress of July 1, 1902, in regard to the lease, sale, or other disposition of the public lands, which at the date of my last annual report had been under discussion before the Philippine Commission for about two weeks, were subsequently further revised and finally adopted by the Commission on October 7, 1903, as the public-land act (No. 926).

This act having been submitted to the President of the United States, and having received his approval, was sent to Congress for its action. Congress adjourned without having taken any steps toward the amendment or rejection of the act, and consequently it thereupon became law by virtue of the provisions of section 13 of the act of Congress of July 1, 1902.

In accordance with the provisions of section 79 of the public-land act the civil governor of the islands, on July 26 last, issued his proclamation putting the same into effect.

Since that date there have been received in this bureau 7 applications for entry of homesteads, 1 for leases, none for sales, and 18 for free patents. These applications have been imperfect in various ways, and it has been necessary to return them for correction. In putting into operation a new law among a people who are not acquainted with the language in which it was enacted, and who are ignorant of American ideas of administrative affairs, we must expect that many difficulties will be encountered and that a considerable period will elapse before it will work smoothly.

Forms of applications for land under the various chapters of the public-land act have been prepared, and, having received your approval, are now being printed. These are in English, but translations into Spanish are being made, and will be ready for use as soon as practicable.

During the year citations have been served on me as chief of this bureau in 11 cases coming before the court of land registration in

which it was believed that the public lands were involved. While the government's interests are protected before that court by the attorney-general, I have deemed it my duty in each of these cases to cause a search to be made among the old Spanish land titles under my custody with a view to the discovery of any facts that apparently might be favorable to the government's interests. When such facts have been found their existence has been called to the attention of the attorney-general, in order that he may make such use of them as he may decide to be proper.

MINING CLAIMS.

One application for a patent to land alleged to contain coal has been filed. At the date of the receipt of this application there were no regulations in force establishing a procedure whereby patents for coal lands could be issued. Subsequently this was provided for by the enactment of Act No. 1128.

Numbers of letters were received during the year, wherein various questions were asked relative to mineral lands and the laws under which they are administered. Some of these have requested a construction of different sections of the laws. In reply to all letters of the latter class the writers have been advised that the bureau prefers not to answer hypothetical questions, but at the same time care has been taken to explain the law as fully as possible. In a few cases where hypothetical questions have been asked, owing to the fact that the questions raised seemed of considerable importance to those engaged in prospecting, an opinion was expressed thereon. Thus, in reply to such a letter, the opinion was expressed that assessment work could not be performed on one claim in satisfaction of the work required to be performed on another; also, that two or more adjoining claims may be located by the same person, provided no two of said claims are located on the same vein; also, that so-called Spanish claims, for which no concession had been granted by the Spanish Government, have no validity.

The act relating to the recording of mining claims (Act No. 624) was amended during the year by Act No. 859, by providing that fees for recording claims should be paid to the provincial or district treasurer; also, by Act No. 1134, which provided for the recording of any instrument relating to the alienating, mortgaging, leasing, etc., of any mining claim, and prescribing the effect thereof.

By Act No. 915, the administration of the so-called Spanish mining grants was transferred from the mining bureau to this bureau, and on October 23, 1903, I signed duplicate receipts for the books, expedientes, etc., turned over to me by Mr. Burritt, at that time chief of the mining bureau. Section 60, act of Congress of July 1, 1902, provides that such grants perfected prior to April 11, 1899, shall be conducted under the provisions of the law in force at the time they were granted, subject at all times to cancellation by reason of illegality in the procedure by which they were obtained, or for failure to comply with the conditions prescribed as requisite to their retention in the laws under which they were granted. Considerable time has been spent in examining the law and records in order to determine the status of these claims, and in arranging and indexing the expedientes relating thereto. As no appropriation had been made for examining them in the field, that work has not been performed up to the present

time. The matter of taxing these claims was the subject of some investigation and consideration, and my views thereon were expressed in a report to you dated February 13, 1904. The matter was finally provided for by article 15 of Act No. 1189, the internal-revenue act.

Reports have been received from the mining recorders of all but five provinces, viz: Albay, Leyte, Nueva Vizcaya, Occidental Negros, and Oriental Negros. These show that there have been presented for record during the fiscal year 201 lode claims, 115 placer claims, and 2 coal claims, making a total of 318.

The following tabulated statement shows the number of claims located under the designations of lode, placer, and coal, respectively, and the kinds of mineral which said claims are alleged to contain:

Province.	Kind of claim.			Kind of mineral.								
	Placer.	Lode.	Coal (Act 1128).	Gold.	Silver.	Copper.	Petroleum.	Coal.	Guano.	Stone.	Iron.	Lead.
Abra	(a)	(a)										
Albay	(b)	(b)										
Ambos Camarines		10		10								
Antique	(a)	(a)										
Bataan	(a)	(a)										
Batangas		12			(c)		(c)					
Benguet	8	43		51								
Bohol	(a)	(a)										
Bulacan	2			2								
Cagayan	(a)	(a)										
Capiz	1			1								
Cavite	(a)	(a)										
Cebu			2					2				
Ilocos Norte	(a)	(a)										
Ilocos Sur	(a)	(a)										
Iloilo	(a)	(a)										
Isabela	(a)	(a)										
La Laguna	4									2		
La Union	(a)	(a)										
Lepanto-Bontoc		36		(c)	(c)	(c)	(c)					
Leyte	(b)	(b)										
Masbate	25	25		(c)	(c)	(c)	(c)					
Mindoro	1	2		1					1	1		
Misamis	8			8								
Moro	(a)	(a)										
Nueva Ecija	(a)	(a)										
Nueva Vizcaya	(b)	(b)										
Occidental Negros	(a)	(a)										
Oriental Negros	(a)	(a)										
Pampanga	(c)	(c)										
Pangasinan		36		30		6						
Paragua	(a)	(a)										
Rizal	21	4		11		1		2	3	3	3	
Romblon	(a)	(a)										
Samar	(a)	(a)										
Sorsogon	(a)	(a)										
Surigao		18		18								
Tarlac	(a)	(a)										
Tayabas	45	12			1	4	22	4	19	4		3
Zambales		3		(c)	(c)	(c)						
Total	115	201	2	132	1	11	22	8	23	10	3	3

a Report no claims recorded. b No report received. c Kind of mineral not stated.

NOTE.—The reports from some of the provinces are only partially complete as to the kind of mineral alleged to have been found.

SYSTEM OF SURVEYS.

In my last annual report I referred to the fact than on August 24, 1903, a committee had been appointed by resolution of the Philippine Commission to make a report on the subject of surveys and to recommend a system for beginning the same.

Judge Williams of the court of land registration was the chairman of this committee, and the other members were Mr. Putnam, of the coast and geodetic survey, Mr. Burritt of the mining bureau, Mr. Beardsley, consulting engineer to the Commission, and myself. Before the committee reached a final decision on its report Mr. Burritt was appointed to a judgeship, and his place on the committee was taken by Mr. McCaskey, who had succeeded him as chief of the mining bureau.

The committee held numerous meetings and discussed at considerable length the different plans submitted by its members, and finally on February 6, 1904, submitted its report. As this report affects the interests not only of the bureaus whose chiefs were members of the committee, but also various other bureaus of the government, and the public at large, I deem it a matter of sufficient interest to include it here, omitting only its formal parts.

The committee appointed by your resolution of August 24, 1903, to make report on the subject of surveys and to recommend a system for beginning the same, have the honor to submit for your consideration the following report and recommendations.

SEC. 1. The needs of the public service in regard to surveys may be grouped under the following heads:

First. Coast and geodetic surveys.

Second. Topographic surveys.

Third. Surveys of the public lands, mining claims, etc.

Fourth. Surveys of those private properties for which the issuance of certificates of ownership may be sought in the court of land registration.

Fifth. Surveys, in detail, for special constructive purposes.

Sixth. Sanitary surveys.

Seventh. Geological, biological, ethnological, and other scientific surveys.

The committee have confined their discussion to the needs of the second, third, and fourth points. The surveys covered by the first are already in progress and should be extended to furnish reliable charts of the coasts and harbors of all the islands, and to include a primary triangulation connecting the islands, and to meet the requirements of the proposed topographical survey. The detailed surveys and investigations required under the fifth, sixth, and seventh headings, must, from their nature, require special expert investigation, and they should be taken up as necessity arises.

SEC. 2. It is highly desirable that a general topographic survey of the Philippine Islands be made as early as practicable. Some of the maps heretofore made are artistic in execution, and limited portions of them may be correct, but it has been demonstrated repeatedly that large portions are inaccurate and misleading. No method exists by which the small and reliable areas may be separated from unreliable portions except by surveys verifying the same. Moreover, it should be clearly understood that no maps exist suitable for topographical purposes and for representing thereon tracts of public or private lands, locations of roads, watersheds, etc. To secure reliable topographical maps of these islands at the earliest practicable date is regarded by the committee as an essential to the government, to a practical knowledge of the natural resources and the distribution of tillable areas, and to the political and commercial subdivisions of the archipelago. The lack of topographical maps is more evident here than it was in the United States before the initiation of surveys by the federal government was begun, for the reason that in the United States both State and local authorities as well as commercial enterprises contributed to map making. These sources of information are almost entirely lacking here, and the Spanish Government has left no topographic maps of practical value. These maps will be of great assistance and economy in the preliminary planning of public works, such as railways, highways, the development of water power, the improvement of waterways and irrigation, in military operations, both of the army and constabulary, in the administration of the government, as showing the extent of provinces and municipalities and the correct relations of towns, and for use in illustrating the resources of the islands, such as public lands, forestry, agriculture, and minerals; as well as for other practical and scientific purposes.

SEC. 3. The desired topographical maps should show (1) natural features, as water systems, including lakes, rivers, swamps, watersheds, etc., together with contours showing general and relative elevations of mountains, hills, valleys, etc. (2) Artificial features, as cities, towns, boundaries, highways, trails, cultivated areas, canals, and similar works of man. The cost of the survey is proportional to the details shown and the scale used,

and requires a careful consideration of interests involved. Such details should be left for the recommendations of the organizing party. It is, however, the opinion of the committee that the final maps for the arable lands should have a scale not smaller than one to one hundred thousand, and show differences in contours of not more than ten meters; that the scale for mountainous regions should be not smaller than one to two hundred thousand, with contour differences of not more than thirty meters; that the present coast and geodetic survey should locally complete the primary triangulation required, in advance of field operations by the topographical parties; and that the final points of reference established by the topographical survey should be sufficiently close to meet the needs of surveyors engaged in the surveys of public and private lands, mining claims, and public works of improvements. Whether the rectangular system similar to the present system in vogue in the United States, a coordinate system having standard meridians and parallels for lines of reference, or the triangulation system controlling topographical surveys, should be used for referencing desired surveys, is a question that may be solved later by the organization undertaking the surveys.

SEC. 4. For the organization of an efficient topographical survey it will be necessary to draw upon the United States for practically all the technical force required. It is therefore suggested that these surveys be undertaken, for the present at least, through cooperation with the United States Government under some arrangement by which the United States may furnish the technical corps, and the insular government furnish the instrumental equipment and pay for labor, supplies, etc. The work would thus have the advantage of an already organized and trained corps of skilled and experienced men, and would be of great value in developing native skill, in promoting technical training in the established schools, and ultimately in training surveyors for the future needs of the islands. The corps needed for the proper organization and execution of the work required might, in our opinion, be secured through cooperation with the United States Geological Survey, which has, doubtless, the largest available supply of skilled topographers.

SEC. 5. It has been demonstrated that a topographical survey may be successfully carried on in connection with a survey of public lands, and that the survey of the latter, when so executed, is much more accurate than it is likely to be when executed separately under the methods customarily employed in the United States.

SEC. 6. We do not hesitate to say that under no circumstances should the Philippine government permit the inauguration in these islands of the contract system of surveys of public lands so long in operation in the United States, and which has so frequently resulted in the inaccurate execution of work and the perpetration of extensive frauds.

SEC. 7. As experience has already shown that very few Americans are willing to sever their connection with the Government service in the United States with a view to remaining permanently in the Philippines, it may be necessary to make some arrangement with the Geological Survey by which men can be detailed to the work in the islands for a term of three or four years, with the assurance that, if they desire it, they shall be returned to the service in the United States upon the termination of that period. Such an arrangement would insure a supply of trained and competent persons, without whom it will be impossible to do the work.

SEC. 8. As far as the surveying of public lands is concerned, to organize the surveying corps as a division of the bureau of public lands would be in keeping with the ideas of Congress as deduced from the act of July 1, 1902, and such an organization would be in accord with the long-established custom in the United States, in so far as the surveying of the public lands would be under the direction of the same bureau that supervises the disposition of the same. Again, the extension of the public surveys over these portions of the public domain where there might be the greatest demand for such extension, because of the needs of settlers and prospective leasers and buyers, would be easily secured.

SEC. 9. On the other hand, the direction of the operations of the topographical survey would call for the possession of technical knowledge of a high character on the part of its head, and to place such an officer under the control of a chief who, while perhaps competent to direct other operations of the bureau, might have no technical training or experience fitting him to decide on matters relating to scientific surveys, would possibly result in hampering the efforts of trained and skillful employees by introducing discordant elements into an undertaking the successful direction of which is of paramount importance. Furthermore, it is not likely that men of years of experience and high standing in the organization referred to would be willing to begin so important an undertaking under circumstances that would tend to deprive them of that recognition to which they would feel they were entitled because of their long service and recognized ability, and which circumstances would unquestionably give to some one else the credit for the successful managementof the work.

SEC. 10 The establishment of a separate bureau of surveys would require the amendment of certain portions of the act of Congress of July 1, 1902, and of acts Nos. 218 and 926 of the Philippine Commission. A casual examination of the acts referred to shows

that act No. 218, United States Philippine Commission, would require an amendment of section 3; that the act of Congress of July 1, 1902, would require two amendments in section 37, two in section 39, one in section 40, and four in section 46; and that act 926, United States Philippine Commission, would require one amendment in each of sections 9, 17, 29; one in sections 34, 36, 38; two in section 39, one in sections 43 and 58, four in section 66, and one in section 70.

SEC. 11. In the matter of lands belonging to private persons and registered in the court of land registration, the most that could be done by the government would be to try and connect such lands by reference with the lines of the public survey. This, however, can not be done until a system of public surveys is inaugurated, and then only as such surveys are extended to the different parts of the archipelago. In the meantime, and until the progress of a general survey makes other regulations possible, the court of land registration should require that every parcel of land registered by it be described with reference to some fixed initial point, such as a definitely described point of a street, bridge, church, barrio, monument, or other permanent object which would serve to establish the identity of the land.

SEC. 12. To avoid the overlapping of property, certain to result where the measurements are merely approximate and made by inexperienced persons, it could be wished that the conditions here were such as to justify the court in demanding, in each case, that the final measurements be made by a competent and licensed surveyor, and that the plat of the land be accompanied by a technical description from which the property could be located and resurveyed from the description submitted at any time. This is particularly desirable in view of the absolute character given to decrees of the court of land registration, and is, we understand, required under the English land-transfer acts, where every plat must be signed by a surveyor duly licensed and gazetted by the Government. Such a requirement here, however, in view of the scarcity of surveyors and the poverty of the people, would doubtless work a hardship if given effect at once. It is desirable, however, that as early as possible all persons in the islands pretending to a knowledge of surveying, and who expect to execute plats for the court of land registration, should be listed, and required within a prescribed time to pass an examination as to their qualifications for such work. It is a notorious fact that very few of the plats executed by native surveyors and maestros de obras can be relied upon in their technical descriptions. Such persons are good copyists and produce well-appearing plats, but these will not stand a critical examination or a mathematical test. It is essential, therefore, that early effort be made to place a premium upon accurate surveys, and to eliminate all those persons who through carelessness or lack of enterprise fail to properly qualify for such work. The following plan is suggested:

(*a*) That all persons claiming to be surveyors, or who expect to do technical survey work in connection with the land court, be required to immediately register with the provincial treasurers or with the court of land registration; that proper blanks be prepared and furnished for this purpose, in which the person registering can set forth, under oath, his preparation for the work, his experience, and other necessary data; that these registration blanks, when filed, be immediately forwarded to the court of land registration for listing.

(*b*) That all persons so registering be provisionally permitted to do survey work for the court for one year, or until such time as the civil-service board, or a committee appointed for the purpose, can submit the persons so registered, and other applicants, to an examination to test their fitness to do survey work.

(*c*) That all persons passing the examinations be granted a license authorizing them to make surveys and submit plans to the court; that the civil-service board thereafter hold examinations for surveyors at convenient intervals, the successful candidates to be granted a license by the court upon certification of the civil-service board.

(*d*) That one or more surveyors be connected with the court of land registration, whose duty it shall be to "check up" plats received purporting to furnish a technical survey of land, as also to examine and make necessary suggestions as to further surveys in the case of plats which do not pretend to be executed by regular surveyors.

(*e*) That some restrictions be placed upon the fees to be charged by licensed surveyors, and that authority be vested in the court of land registration, or other proper department, to revoke the license of a surveyor when it is found either that his work is grossly inaccurate or that he is using his position for wrongful ends.

(*f*) That arrangements be made whereby surveyors connected with the court of land registration, the bureau of public lands, or other government offices, may do survey work for private parties under a fixed schedule of fees, the money thus collected to be deposited in the insular treasury.

(*g*) That whenever it is considered practicable it will be required that the descriptions of private lands shall give the bounds by distances and courses, referred to the true meridian, and eventually all lands registered by the court of land registration shall be so described, including lands previously registered.

(h) That all lands acquired by condemnation proceedings, by foreclosures, by inheritance, or by other legal processes, except by direct purchase, after January 1, 1906, be submitted to registration in the court of land registration.

(i) That whenever the general topographic and land survey shall be fully organized and in operation the employment of surveyors by the court of land registration shall be discontinued.

SEC. 13. Before any comprehensive system of surveys of public lands can be put into operation in these islands the public-land act recently enacted by the Commission probably will have become law, and it will be necessary that the bureau of public lands be provided without delay with a temporary corps of surveyors to execute surveys of lands that may be disposed of under the provisions of that act. There is not a sufficient number of competent surveyors to be found in these islands to form such a temporary corps, and they can not be obtained through the medium of the Philippine civil-service board.

SEC. 14. It may be necessary to secure in the United States the services of the men which are needed. Men showing diplomas from reputable schools of engineering could safely be accepted without other examination than as to their integrity, while those who have never graduated in such institutions, if believed to be competent and known to be trustworthy, could be accepted with the understanding that they would have to pass a technical examination within one year after their entry into the Philippine service.

SEC. 15. Such a corps of surveyors should be utilized as such only as long as there is work for them to do outside of the limits of the regions covered by the general system of topographic and public-land surveys hereinbefore mentioned, and as rapidly as practicable the men composing this corps should be transferred to the regular corps engaged in the extension of the regular system of surveys. The only reason for the employment of such temporary corps as herein suggested arises from the necessity of furnishing prompt means for putting into operation the provisions of the public-land act in regard to the leasing, sale, and other methods of disposing of the lands of the public domain.

SEC. 16. Your committee have no doubt that the metric system should be used in the execution of all topographical and land surveys in these islands. In addition to its well-known advantages arising from its harmony with our system of enumeration, from the exact and simple relations existing between its different orders of units, etc., there are other reasons for its adoption which in our opinion make the consideration of any other system unnecessary. It is in use in most of the civilized countries of the world, except English-speaking countries; it has been almost universally adopted for scientific measurements; it is already familiar to the educated portion of the native population of these islands, where it has been taught in the schools and employed in the official acts of the Spanish Government for many years; and Congress has evidently contemplated its use in the surveying of the public lands of the archipelago, as is evidenced by provision of the act of Congress of July 1, 1902; and more particularly it is the only scientific standard of length heretofore used in these islands.

SEC. 17. In connection with the act of Congress of July 1, 1902, we desire to call your attention to the following incongruity in regard to standards of measurement: An examination of sections 13, 14, 15, 18, 43, 48, and 53 plainly shows the intention of Congress to apply the metric system to the surveying of the public domain and to the location of coal lands thereon. A like examination of sections 22, 23, 24, 25, 31, and 39 shows that Congress intended that lode claims should be measured in feet and that their contents should be computed in acres, while sections 43, 44, and 48 show that placer claims are to be computed in hectares.

RECOMMENDATIONS.

It is respectfully recommended by the undersigned that:

(1) The United States Geological Survey be requested upon such terms as the Commission may deem wise, to send to these islands immediately a person competent to organize and direct a combined topographic and public-land survey, in order that by consultation with those officers of the Philippine government most interested and most familiar with existing needs he may be able to thoroughly understand the situation here before deciding upon many matters of detail which in our opinion can only be properly decided by an experienced person who is on the ground.

(2) That the system of primary triangulation which must form the basis for the combined topographic and land survey should be founded upon the work already done and to be done by the United States Coast and Geodetic Survey, and that wherever necessary such primary trangulation should be extended sufficiently into the interior to cover the needs of topographic surveys.

(3) That the metric system be used in all topographic and land surveys executed under government control in these islands.

(4) That a combined topographic and land survey be organized, if practicable under some arrangement for cooperation with the United States Geological Survey, and that this topo-

graphic and land survey have such relations to or connection with the bureau of public land as may be found advisable.

(5) That in addition to the corps of surveyors executing the combined topographic and land survey, a temporary corps of surveyors be organized in the bureau of public lands to execute surveys that can not await the extension of the general system.

(6) That the surveys of lands for which the issuance of certificates of ownership is sought in the court of land registration should be executed in the manner herein set forth.

(7) That suitable scales and standards of accuracy to be employed in the work, the features to be shown on the maps, the units of measurements, the details of subdivision of public lands, the establishment and character of monuments to mark the limits of the same, be left to the decision of the officer who shall finally organize the general system of surveys, but that such decision be not made without consultation with all interests that shall be likely to make extensive use of the maps that may be hereafter issued.

(8) That amendments to the act of Congress of July 1, 1902, be requested so that the extent of lode claims shall be limited by meters instead of by feet.

The speedy adoption of some definite and comprehensive system of surveys is, to my mind, of pressing importance. The use of temporary substitutes for a systematic combined topographic and land survey is no improvement on the methods followed by the Spanish Government during its occupation of the archipelago, and the longer the adoption of an adequate system is delayed, the greater will be the difficulty in adapting it to the conditions that will inevitably exist at the time it may be put into operation.

RECORDS OF SPANISH LAND TITLES.

During the last twelve months there have been examined and entered on the tabulated lists of expedientes relating to Spanish land titles the following:

Expedientes of sales and composiciones	3,284
Expedientes of illegal appropriations	603
Total	3,887

This number added to that of the expedientes examined and entered prior to September 1, 1903, make a total of 14,071 so far examined and listed. This work is carried on from time to time by the native employees of the bureau when not engaged in more pressing work, and will probably be completed within the next year.

There were made during the same period 29 certified copies of Spanish documents from the old land titles and one tracing of a map.

The aggregate number of words in these copies was 35,440 and the fees received for copying making the necessary searches and certifications amounted to $42.47, United States currency, and $17.53, Mexican currency.

SAN LAZARO ESTATE.

Pursuant to the instructions of the Civil Commission on August 27, 1903, the city engineer of Manila has completed plans for the improvement and extension of the street system in this district. Very little of the actual improvement to the streets has as yet been made by the city, although the stone monuments marking the corners of the streets have been put in at about one-third of the points where they will be required.

As the city of Manila has charge only of the work connected with the location of the streets and their improvement, this bureau began, on February 17, 1904, a resurvey of the entire estate, selecting such

blocks as had been definitely established by the city engineer, and dividing them into lots of such dimensions as those of the blocks permitted. These lots vary in areas, as the blocks themselves vary, and it has been the aim of the bureau to make the subdivision with a view to the convenience of the tenants, the betterment of the sanitary conditions, and precautions against fire. This will have a tendency to increase the value of the property and the amount of the revenues accruing to the government. Upon the completion of the survey of each block, the tenants, who before had constructed their houses without regard to order, alignment, or common convenience, were induced to remove their houses within the lines of the regular subdivisions, and to align them according to an established rule. Little or no opposition was experienced in accomplishing this, the tenants by their ready cooperation showing a very praiseworthy interest in the plans for the improvement of their situation.

Out of the 120 to 130 blocks into which the estate is now divided by the intersection of the new street system, the subdivision into lots has been completed in 24 blocks and 14 more have been subdivided as far as tardiness of the construction of the new streets has permitted.

Pursuant to a resolution of the Commission, under date of September 8, 1903, and by arrangement with the city engineer of Manila, and the sanitary engineer, in all blocks destined for the construction of nipa houses, spaces have been reserved for the erection of public closets, which will take the place of the insanitary private closets formerly built by the tenants. Although some of these spaces have been available for the past six months, none of the closets have been built, but I understand that the city engineer contemplates the erection of a number of them within a short time.

On April 21, 1904, there occurred one of those disastrous fires which will continue to devastate the San Lazaro property as long as nipa and other light material are permitted for building purposes. Upon that date two blocks of buildings were almost totally destroyed, but have since been rebuilt with like material. According to the rules now enforced by this bureau, only a given number of houses of light material are permitted in each block. This provision, with the establishment of numerous alleyways intersecting the nipa blocks, will in some measure tend to reduce the liability to fire.

For the year ending August 31, 1904, the total amount of rents received was $15,988.92, as compared with $12,670.92 for the corresponding period ending August 31, 1903.

On June 14, 1904, the archbishop of Manila and the religous corporation of the Franciscan Fathers of the Province of San Gregorio Magno of the Philippines, brought suit against me, alleging that as chief of the bureau of public lands I claimed the right to administer the property of the San Lazaro Hospital, and was depriving the plaintiffs of their right to administer the same in compliance with the wishes of the founders of the said hospital.

In virtue of the allegations of their petition they pray that the administration of the hospital and its property be turned over to them, and that I, my agents, and subordinates, be prohibited from intervening in the administration of the same, and that I be ordered to render an account of the incomes and benefits yielded by the estate since the year 1898.

I have had an examination made of all sources of information under

my control affecting this matter, and have also extended my investigation to documents in the bureau of archives. In my letter of July 7, last, I invited your attention to the existence of certain documents in the latter bureau, which I hope will aid the attorney-general in preparing the government's defense. So far as I have been able to acquaint myself with the facts bearing on the case I am convinced that the plaintiffs can not establish their contention before any impartial tribunal.

In my last annual report I referred at length to the suits brought by me, as administrator of the San Lazaro estate, against Roman Martinez, Mariano Velasco,and Vicente Cenjor, to set aside contracts of lease held by them for certain lands of the estate. During the past year these suits have been tried, and in each case the government was defeated. Appeals have been taken to the supreme court. I have little hope that the decisions can be reversed.

On October 16, 1903, Doña Lucia Rizal brought suit against me to recover the possession and ownership of certain property which she claims to own within the boundaries of the San Lazaro estate, and of which she alleges she was unlawfully deprived in the year 1900. She asks for 826 pesos damages and such further relief as the court may deem equitable.

It is the opinion of the attorney-general, who has investigated the case, that the probabilities are that the plaintiff will obtain judgment.

I have recently recommended that suits be instituted against a number of tenants of the San Lazaro estate, with a view to their ejectment from the property. The necessity for doing this I very much regret, but all ordinary means of inducing these people to keep their engagements with the government had failed, and nothing was left but to compel them by legal steps to recognize the government's ownership and its resulting rights.

A growing disposition on the part of many of the tenants to avoid the payment of their rents has been noted during the past year. This disposition, if it did not have its origin in the suggestions of certain habitual mischief-makers and agitators, at least has been fomented by them. It is hoped that a few vigorous prosecutions of the habitual delinquents will have a beneficial effect upon other tenants of similar tendencies.

THE FRIAR LANDS.

By Act No. 1120 of April 26, 1904, the Commission made provision for the administration and temporary leasing of certain haciendas and parcels of land commonly known as "friar lands," for which the government had some time before made contracts of purchase.

Preliminary to the vesting of title to these lands in the government of the Philippine Islands it was necessary to have careful surveys made of the various tracts in order to ascertain whether they contained the amount of land stated in the contracts.

This work was imposed upon the consulting engineer to the Commission, and I understand has been completed.

In the near future the work of subdividing these properties and attending to the details of leasing and selling the different subdivisions will devolve upon this bureau.

APPROPRIATIONS AND EXPENDITURES.

Attached to and following this report is a statement of the appropriations and expenditures of the bureau from September 1, 1903, to August 31, 1904, both dates inclusive.

INCREASE IN ESTIMATES.

The necessity of making preparation for the surveying of the large number of individual holdings on the friar lands, for carrying into effect the provisions of the public land act and the mining laws has made necessary a largely increased estimate for expenses for the present year.

At present there are 23 positions authorized by law in this bureau, not counting laborers employed on the survey of the San Lazaro estate, which are but 4 in number. Of these positions only 15 have been filled at any one time.

For the coming year I have estimated that I may need an office force of 26 men, instead of 23, as now authorized by law, and a field force of 25, not counting laborers that may be employed from time to time.

New employees will be appointed as rapidly as they may be needed and can be obtained.

In view of the scarcity of competent available surveyors in the Philippines, and the necessity of sending to the United States for the needed instruments, it is not believed that it will be possible to get surveying parties into the field before the 1st of January.

CONCLUSION.

On three occasions during the past year I have been ordered to different points in the islands on special duties not connected with the ordinary work of my bureau. I made a trip to San Fernando de la Union and another to Bacolod to assist officers of the bureau of justice in criminal cases involving questions of disputed handwriting. At a later date I was sent to Culion to buy the property of private owners at and in the vicinity of that village, with a view to the establishment of a leper colony. The results of my work at Culion were set forth in my report to you of July 15 last.

These absences from my regular work aggregated four months, and prevented my giving my personal attention to a number of matters mentioned in my last annual report and which I hoped to be able to critically study and to lay before you in this. It is now impossible to do so.

Respectfully submitted.

WILL M. TIPTON,
Chief Bureau of Public Lands.

Hon. DEAN C. WORCESTER,
Secretary of the Interior, Manila, P. I.

Statement of appropriations and expenditures for bureau of public lands, from September 1, 1903, to August 31, 1904.

	Appropriations.	Expenditures.
Act No. 807:		
Salaries and wages remaining at last report	$5,676.07	$5,616.60
Transportation	*a* 264.50	200.00
Contingent expenses	*b* 532.52	197.93
Total	6,473.09	6,014.53
Act No. 870:		
Salaries and wages remaining at last report	466.68	466.65
Act No. 1049:		
Salaries and wages	10,100.00	8,997.97
Hire of laborers for San Lazaro estate	300.00	160.50
Transportation	300.00	300.00
Contingent expenses	*b* 800.00	345.52
Total	11,500.00	9,803.99
Amount drawn to pay salaries for July and August, under provisions Act 1155.	3,104.26	3,104.26
Total	21,544.63	19,389.43

Collected for certified copies of Spanish land titles and maps, $42.47, United States currency; $17.53 Mexican.

a $31 held for payment of an outstanding obligation
b Estimated amount of $700 held for payment of supplies ordered but not yet received.

APPENDIX L.

REPORT OF THE CHIEF OF THE BUREAU OF AGRICULTURE.

MANILA, *September 5, 1904.*

SIR: I have the honor herewith to render my annual report for the year ending August 31, 1904:

The former chief of the bureau went on leave of absence on December 15, 1903, and subsequently resigned his position, to take effect on March 23, 1904. Among other changes in the personnel may be mentioned: The resignation of W. J. Boudreau as superintendent of the rice farm at Murcia, his place being temporarily filled by C. E. Miles; the transfer of W. J. Richmond, superintendent of Singalong Experiment Station, whose work has been done by J. A. Gruver, gardener, and Z. K. Miller, expert in farm machinery, under the direction of the chief of the bureau; Thomas Hanley, tropical agriculturist at Baguio and Trinidad, being succeeded by Will Jessup; A. P. Hayne, director of the agricultural college, resigned, his place being temporarily filled by John Heil, farm foreman; James H. Shipley, superintendent of Batangas Experiment Station, resigned to engage in private business, his place being temporarily filled by the transfer of J. A. Gruver, gardener; Regino Garcia, botanist, resigned to engage in private business, this position being abolished; Percy Angell, record clerk, and C. C. Young, property clerk, resigned to engage in business, their places being filled by J. C. Wilson and Frederick L. McVeigh, respectively, by transfer. Harry T. Anthony was transferred to the bureau of agriculture as clerk at the agricultural college, vice H. H. Pierce, removed. Several resignations and removals have occurred among teamsters and minor employees. A. M. Sanchez, soil physicist, arrived from the United States and entered upon his duties on December 16, 1903.

The year shows a gain of 9 and a loss of 16 employees, or a net loss of 7. The number of laborers employed has been quite largely increased, owing to the land cleared and increased work done at Trinidad, the rice farm, the agricultural college in Negros, the new dairy farm at San Juan del Monte, and the San Ramon farm in Mindanao. It was my opinion that it would be quite beneficial to our service to have more laborers, more animals, and more work done in proportion to the force of salaried men employed. This top-heavy condition has been relieved by the very substantial increase in the means for doing work and the work being accomplished on the one hand and the material reduction in the salaried force on the other.

Notwithstanding a large increase in our estimate for labor for the year 1904–5 ,other items have been so reduced that the total estimate

indicates a saving of some ₱70,000 Philippine currency from the actual expenditures of the year 1903-4.

Increasing attention has been paid to the sale of surplus products from the different stations and farms. The sales of vegetables, forage crops, and corn at the Batangas station have for the past few months been quite sufficient to meet the monthly expenses, while quite large amounts have been collected from the Manila and Trinidad stations and the agricultural college in Negros. There is no reason why the miscellaneous sales should not be increased still further and amount to several thousand dollars during the present year.

The same lines of work as given in the last annual report have been followed. It was considered that, with the eight stations and farms of the bureau, quite enough had been undertaken, and that the real need was to put more energy, material, and labor into these enterprises and thus get better results from them. An exception was made, however, in the case of the new dairy farm, lately established on the powder-mill property just east of San Juan River bridge. The following letter and excerpt from the minutes of the honorable Philippine Commission will explain the object and plan, so far as then developed, of this dairy farm.

BUREAU OF AGRICULTURE,
March 10, 1904.

SIR: I have the honor to recommend that 60 high-grade Jersey heifers and young cows, immune to Texas fever, be bought out of Congressional relief fund and that a dairy be established for the purpose of supplying the hospitals with a good supply of pure, fresh milk.

The bureau of government laboratories believes the object to be attained well worth the risk of loss from disease, which is certainly much less than heretofore.

The surgeon of the civil hospital says he was getting ready to ask for the establishment of a dairy by that institution, so great is the expense of a milk supply and so unsatisfactory the supply obtained. Their milk bill is now running at the rate of over $4,000 gold a year. He says further that there is no objection whatever to grade Jerseys for this purpose, as the milk can be so diluted and sugared as to give it any composition likely to be desired. As a matter of fact, the proportion of casein to other solids in Jersey milk is slightly less than in the milk of other breeds of cattle.

I recommend this breed because we have pure Jersey bulls already; because I know of no considerable number of Holsteins, Ayrshires, Guernseys, or other dairy breeds certainly immune to Texas fever, and because all Australian cattle I have so far seen are largely of shorthorn breeding and hence rather inclined to be beef cattle.

I recommend to be allowed to get these cattle at Starkville, Miss., which has for forty years been a center from which Jerseys and their grades have been shipped throughout the Southwest and to Mexico and Cuba. I would get them through the professor of agriculture, professor dairy husbandry, and director of the experiment station of Mississippi.

Young cows and heifers of three-fourths to thirty-one thirty-seconds breeding, springing with calf from pure bulls, will cost there not over $27.50 each, put on cars. I estimate that $12.50 each will put them on boat at San Francisco.

A reliable man, an agricultural college graduate of high standing, can be gotten to accompany them here for $100 and all expenses, charging nothing in expenses or wages for return trip.

These recommendations are based on the supposition that they can come on the *Dix* at its sailing May 10, and, if so, can be delivered here within $50 gold each. They could be carried in the space occupied by 25 or 30 horses and might safely be penned, as in a car, instead of having separate stalls.

It is my opinion that, on account of better isolation and quarantine facilities, a small portion of the friar estate near Marilao would be best for this undertaking, if decided on. Milk could be shipped in twice a day.

With the initial cost of cattle, buildings, fences, sterilizing plant, vessels, bottles, water supply, etc., $6,000 United States currency will probably be needed to bring a 60-cow dairy to production, depending very largely on kind of building erected.

With 45 cows at the pail constantly, giving 60 gallons of milk a day, at 75 cents gold a gallon, or $45 gold a day, a very large margin would surely be available for expenses and

risk and profit. I can feed milch cows well here for 20 cents United States currency each per day.

It would need to be determined by cable if the *Dix* can carry this number of young cattle, in order that I might have time to write and make all arrangements to have the cattle at San Francisco at the right time.

In asking to be allowed to have these cattle purchased, I have no interest whatever, directly or indirectly, in any cattle.

Very respectfully,

W. C. WELBORN,
Acting Chief of Bureau.

The SECRETARY OF THE INTERIOR, *Manila.*

THE GOVERNMENT OF THE PHILIPPINE ISLANDS,
EXECUTIVE BUREAU,
Manila, March 12, 1904.

SIR: I have the honor to submit for your information and guidance the following excerpt from minutes of the Philippine Commission of March 11, 1904:

"Commissioner Smith, in the absence of Commissioner Worcester, called the attention of the Commission to the desirability of authorizing the acting chief of the bureau of agriculture to secure a herd of Jersey cattle for breeding purposes and recommended that a dairy be established near Manila in order that the milk from the herd might be sold to hospitals and private persons.

"After consideration by the Commission, on motion, it was

"*Resolved*, That the civil governor be authorized to expend, from the fund of $500,000 appropriated by Act No. 1046 from the Congressional relief fund, the sum of $3,500 in money of the United States for the purchase and bringing to Manila of a herd of 60 Jersey grade dairy cows and heifers. It was

"*Further resolved*, That the acting chief of the bureau of agriculture be allowed to make direct purchase of these animals and be authorized to employ a competent attendant to accompany them, the attendant to receive in full compensation for bringing these animals to Manila $100 in currency of the United States and his actual and necessary traveling expenses from his home to Manila, no return expenses or wages on the return trip to be allowed him."

In accordance with the provisions of section 2 of Act No. 1046, the civil governor has designated the disbursing officer of the executive bureau to disburse the funds authorized to be expended under the above resolution.

Very respectfully,

A. W. FERGUSSON,
Executive Secretary.

The CHIEF OF THE BUREAU OF AGRICULTURE,
Manila, P. I.

Sixty-four cows and 1 bull were bought at the price mentioned. Sixty arrived safe in Manila after a trip occupying two months of time and over 10,000 miles of distance. Milk is already being delivered twice daily to the civil hospital and a largely increased supply is expected in the near future as the cows come fresh in milk. The following letter, in reply to one from the bureau of agriculture requesting an expression of opinion as to the quality of the milk, may be of interest:

PHILIPPINE CIVIL HOSPITAL,
Manila, P. I., September 7, 1904.

To W. C. WELBORN,
Chief, Bureau of Agriculture, Manila.

SIR: In reply to your inquiry of the 5th instant as to how much milk will be wanted by the civil hospital when your dairy arrangements are completed, I have the honor to inform you that we will wish about 18 gallons daily.

I wish to thank you for your kindness in sending the small quantity daily, without charge, while waiting for the completion of your dairy arrangements. We find the quality excellent so far and are utilizing it to great advantage.

Very respectfully,

H. EUGENE STAFFORD,
Attending Physician and Surgeon, Civil Officers and Employees.

A building formerly occupied by Spanish soldiers, and hence belonging to the Philippine government, was in the meantime repaired, enlarged, and made fly proof. Some excellent pasture land adjoining was fenced in, a good pure water supply was piped to the building, and everything made ready for beginning business.

The disastrous losses of cattle and carabaos in the islands during the past few years have well-nigh discouraged all private enterprise in the dairy business. Several promising herds were entirely wiped out, and it was estimated that 60 to 90 per cent of all horned beasts in the archipelago died of rinderpest or other contagious diseases. But, with the proof that foot-and-mouth disease can be cured and rinderpest prevented by inoculation, the business of dairying again looks encouraging. There are some other diseases, it is true, still to be dreaded, but it is confidently hoped that by taking every sanitary precaution no serious trouble will occur.

If cattle can be kept healthy, dairying will prove particularly remunerative. The small supplies of milk now to be had retail at about $1.20 gold a gallon. Of course no large market could be expected at so high a price, but a very large market could no doubt be found at prices over 100 per cent higher than those prevailing in cities of the United States. There seems no reason why a fairly good flow of milk may not be had here. It is true tropical grasses tend to coarseness, and soon become tough and woody, but green corn, teosinte, sorghum, and various other succulent crops grow the entire year with a luxuriance not surpassed anywhere. For concentrated feeds, rice by-products are as cheap as in Louisiana, and wheat bran from Australia costs some 25 per cent more than in the Eastern States.

The cocoa nut cake so far tried here has not been handled well enough to make a desirable feed. It probably comes from the press too moist, and does not keep well. In Europe and America it is a highly esteemed cattle food. No Chinese bean cake has been tried here, but the bean producing the cake and oil of China and Japan is now growing here nicely in an experimental way. The velvet bean, largely grown in Florida, flourishes splendidly here, so that there can be no doubt of a good and fairly cheap supply of concentrated feeds containing abundant protein for best milk production. The temperature is never as high here as it is for three months in the Gulf States.

The wet season will present some difficulties. Swarms of biting flies multiply during the wet weather, and lots and approaches to barns are apt to become muddy. Fly-proof barns and good rock or cement floors will largely offset these troubles.

A complete outfit for the pasteurizing and the best sanitary handling of the milk is expected from the United States next month. It is hoped that all the hospitals will, in the near future, be supplied with an abundance of pure, rich milk, handled as scientifically and as attractively as could be desired. Should more be produced than may be needed for these institutions, some will be sold to individuals.

Mr. B. L. Moss, an agricultural-college graduate, has been appointed to manage the dairy, and the Filipino laborers so far promise to become excellent milkers, and to be more than ordinarily kind, patient, and gentle with the cows.

The bureau has recently had analyzed at the government laboratories a can of the most popular and the highest priced brand of concentrated cream, so largely used in this market. The amount of actual fat or cream was most disappointing, containing only 7.29 per cent. As actual fat content is the controlling factor in the value of milk or cream, a comparison is made with Jersey milk fresh from the cow, which contains 5 per cent of fat.

At this rate it takes 7.66 cans of the cream to equal one gallon of fresh milk. This cream sells by the case at 11 cents gold a can, which will give the fresh milk a value, in comparison, of 84 cents gold a gallon. Considering the better flavor of the fresh milk, $1 gold per gallon would not be a high retail price for fresh Jersey milk.

OTHER LIVE STOCK PURCHASES.

Since the last report the bureau has received 8 Australian mares, 33 native pony mares, 40 mares from Kentucky, 13 stallions, 10 jacks, 5 head Jersey cattle from the United States, 4 Berkshire hogs, and representatives of 3 breeds of American chickens, besides 10 Australian work horses. Thus far no epidemic disease, generally so prevalent and fatal here, has attacked these animals.

It is clear to my mind that to make horse breeding profitable here the mares must also work to pay for their feed, as they do in the agricultural districts of the United States. It is quite certain, I think, that in most parts of the archipelago good horses will not thrive and raise good foals on grass alone. They must have some feed, and this is too expensive to make the business profitable without working the mares. Hence the greater portion of these mares are being sent to the larger farms under the control of the bureau, where they will be worked, fed, and bred. Moreover, horses have not done at all well at the stock farm on Culion Island, and those remaining there will be moved to these farms also. The pony mares of the islands, weighing some 500 pounds, have proved their capacity to live and multiply on the native grasses, as do the ponies of the Western plains. To what extent these small, hardy native horses can be improved by crossing with better and larger horses, without artificial feeding and care, is a problem needing solution. Good care and rich food would in itself increase the size of the native ponies. Crossing with larger horses will be the most direct way to increase their size, and the resulting crossbred horses will certainly require better food and care than native ponies usually get, if the increased size and better qualities are to be made the most of. It is a fact with all live stock that, as their size is increased and their qualities improved, they lose something of their rustling powers and require better feeding.

On the other hand, many generations of hard conditions reduce the size and, by a natural process of selection, produce animals abundantly able to survive and even thrive under severe natural surroundings. Probably, by the law of the survival of the fittest, the Texas mustang and the Philippine pony, both no doubt largely descended from Arab blood, have become marvels of strength, speed, and endurance.

There is wide apprehension on the part of horsemen with whom I have talked as to the danger to the mares and to the foals in breed-

ing any but the smallest American horses to the native mares. Breeding any of the jacks we have to any but the largest native mares is an equally doubtful proposition.

It has been suggested (and it seems to me wise) that, if trouble is found in breeding American stallions to native mares, American mares may be served by the best native horses, and the result of that cross bred to the native mares. I would not doubt that the final result of this system of breeding, with better environment, will result in a much larger and better breed of horses. If trouble is found in using the jacks on native mares, their service will probably have to be confined to the mares brought over for the use of the Army and the insular government.

A few of the best mares and stallions will be sent to Baguio, where a small breeding station will be maintained. Dr. H. L. Casey has been engaged for this work, which will be enlarged by adding a considerable number of the best native mares that can be obtained. It is feared that sooner or later epidemic diseases are likely to invade the farms and destroy the breeding stock. In the high country it is believed immunity from disease is much greater.

The cost of food is higher in the mountains and the opportunities for working the mares not quite so good as at the other farms, but the Trinidad station offers some opportunity for working the mares, and considerable forage may be grown there.

Several of the stallions and jacks will be placed at stations in the islands where there are good native mares, and their services will be given free to the people. Accurate and permanent records will be kept of all mares served and all foals resulting. It is believed that many of the people are too poor to pay service fees, and that many would not at first sufficiently appreciate good sires to pay even a small fee. Altogether, it is not believed that enough service fees would result to pay for collecting the same and that, with free service, the people will more readily and heartily cooperate in keeping records of their mares and colts than if fees were to be collected.

JERSEY CATTLE.

In December, 1903, five head pure Jersey cattle came over—2 heifers and 3 bulls. As these cattle came from north of the Texas fever quarantine line, they were kept free from infection by the fever tick existing here until they could be inoculated against it. All were safely inoculated and saved from the fever, while cattle belonging to individuals, arriving on the same boat, died. One of the bulls afterwards died of lumpy jaw, but the breeder from whom it was purchased has promised to deliver another one in its stead. The cows have both dropped calves since arriving, but one calf was lost. Neither cow has given entirely satisfactory results in milk, but this was no doubt largely due to the fact that they had no pasture and no fly-proof stable in which to stand. Otherwise, these cattle have done perfectly well.

These cattle will be moved to the new dairy farm, where much better results are expected during their next milking period.

The Berkshire boars brought out last winter have done perfectly well. They were too old and large when they came, and are now so heavy as to be of little service. The people were greatly pleased at their trim, smooth appearance, as contrasted with the slab-sided,

sway-backed specimens of the islands. The Florida razorback is a beauty compared to one of these. Many half-bred pigs have been raised and sold to the people at a low price. The demand being so great an additional lot of 9 head of Berkshires for breeding has been ordered from the States by cable, and they should be delivered here next month.

Hog raising should be a good business in the islands. About 10 cents gold per pound for hogs on the hoof seems to be the prevailing price. This is just about 100 per cent higher than the average prices in the States. These prices can hardly be shaded until hogs enough are raised and marketed to supply the half million dollars gold worth of ham, bacon, pork and lard now imported annually into the archipelago.

What are our resources for raising hogs? Rice polish (called here tique tique), having a composition about like an equal mixture of corn meal and wheat bran, sells at about $15 gold a ton, or about the same price as corn meal in the Middle States. It is an excellent growing and fattening food. Cocoanut cake can be had in some places for even less. Shelled corn is a commercial article in many sections, at 1 cent gold a pound. Three crops of sweet sorghum may easily be grown on the same land in a year, and one crop produced for the bureau during the last dry season at the rate of 28 bushels of seed per acre. Cut and thrown to hogs about the time the seed are ripe, the seed and the sweet juice of the stalk make an excellent food. Owing to bad seed, the bureau is just now bringing to maturity its first crop of Kafir corn, a nonsaccharine sorghum. Its yield of grain is much larger than that of Indian corn or sweet sorghum, and the grain ground and fed to hogs is worth 80 to 85 per cent as much, pound for pound, as corn meal. Three crops of this may be grown on the same land each year. Indian corn, while I have not seen it make good crops of grain generally—10 to 15 bushels per acre, I would judge—will easily make four crops a year on the same land, if irrigation is afforded for a while in the dry season. Corn, cut stalk and all, while in the roasting-ear stage, makes excellent hog feed. Soy beans, velvet beans, and every plant of the whole bean tribe, whether for human or animal food, thrive excellently well. The Spanish peanut, so much grown for hogs in the Southern States, I have seen make as fine crops here as it ever did at its best in the States.

With hogs and such a list of accessible and cheap food stuffs, men of enterprise can make money raising hogs or hog products. Hogs are freer from disease here than in the States, according to my observation. Ice and cold storage are abundant and reasonably cheap for anyone that might wish to slaughter instead of selling on foot.

PURE-BRED FOWLS.

Splendid representatives of three breeds of chickens were brought over last December—brown and white Leghorns and buff Cochins. These appeared to do quite well, as long as the dry season lasted. The Leghorn breeds particularly layed very well. Difficulties were met in raising the young chicks, and these difficulties grew greater as the wet season came on. Both our own efforts and those of an expert fancier in the neighborhood, to whom we loaned a trio, met with well-nigh complete failure. Better success was had with raising half-

breeds of the Leghorn types. But these half-breeds are very much the same, in form, size, and qualities, as the native chickens so numerous all over the islands. These are small, hardy, active fowls, and well muscled, and they possess a good proportion of white meat of excellent flavor.

Chickens for the table are abundant here at prices lower than in the States, and eggs, though smaller in size, retail at 15 cents gold a dozen. With the extra cost of living here, it is almost certain that white men could not compete with the natives in raising chickens and eggs on an ordinary commercial basis. Along with his fighting cock, the native loves his chickens generally, certainly next to his family. It would be a wonder, then, if he had not developed about the best fowls for his surroundings. Certainly no white man can afford to devote the time and attention to the business that the native does, unless he be a true fancier with money to burn. So far as I have learned, no one buying eggs from the bureau has been at all pleased with results.

So far but very few turkeys have been raised here. The Americans seem to have introduced the few seen here and the natives, so far as I have observed, have not taken hold of the business at all. If young turkeys could be hatched in the early part of the dry season, conditions would seem to be fine for rearing them. There seems to be no guinea fowls at all here. If guinea fowls and turkeys were as numerous as chickens are, there is good reason to believe that the damage from locusts would be greatly lessened, as these classes of fowls are noted for their foraging and insect-catching propensities.

BEEF BULLS.

Besides an Australian bull, apparently a nearly pure Shorthorn, now being used on the stock farm at Culion Island, a young Devon and a young Galloway bull have been cabled for from the States, and are expected to arrive next month. The cattle of the islands are the typical Chinese and Japanese cattle. They are small, hardy, compact animals, with a slight hump on the shoulders. They make very good beef and work cattle; but the cows, while resembling Jerseys to a remarkable extent, have never been used for dairy purposes, and show no promise in this direction. I have seldom seen one of these cattle anywhere in the islands that was not fat on the native grasses. The best and largest cattle I have seen were in the province of Batangas. The other cultivated sections, where Bermuda and other short grasses flourish, have generally shown fatter cattle than sections where the long, coarse grasses monopolize the land. The next best cattle I have seen were in the high mountain regions of Benguet.

About a million dollars worth of cattle are imported annually into the islands and, although an average steer weighs 700 pounds on the hoof, $40 is an average price. This is about 100 per cent higher than the same class of steer would sell for on the Fort Worth or New Orleans market. With cattle selling at nearly 6 cents gold a pound, on foot, there is only one difficulty that I can see to be overcome, and that is the matter of loss from disease. With inoculation against rinderpest a success, there would seem no difficulty in the mountain and foothill regions, where foot-and-mouth disease would not be apt to show itself. With a market assured at 100 per cent above United

States prices until $1,000,000 United States currency worth of imports of cattle and cattle products shall be supplied, with a perpetual supply of pure water and green grass, with no blizzards to occasion losses, growing Chinese or native cattle under ranching conditions in a large way ought to be one of the most attractive business propositions in the world.

Just how far these cattle might be improved in size and quality and still retain their rustling abilities is as yet unknown to me. It is a fact that, in breeding off the horns of the Texas longhorn and breeding size and quality into him, his progeny has also had bred into it the necessity for better grass, nearer water supply, and big hay stacks. An experiment with Devon and Galloway bulls in the cool mountain regions will be most interesting, and I should also like very much to see a Scotch Highland bull tried under similar conditions. All of these breeds are among the smaller beef breeds; they produce the finest quality of beef, and are notable rustlers and hill climbers. The Devon, in particular, makes the best work ox known. Any of these bulls crossed with native cows should increase size and improve quality, and not cause considerable loss in the rustling powers of the offspring.

The rice-growing sections and the cultivated lands generally in the archipelago grow as fine short grasses as anyone could wish. Rice is harvested in December, and the land lies absolutely idle till July. Last season the young, tender Bermuda and other fine short grasses kept fresh and tender the entire six months, and were certainly nutritious enough to maintain any class of cattle in prime condition.

When the question of disease is settled raising fine cattle and running them in the mountains for six months in the wet season, and bringing them down on the rice fields lying idle in the dry season to grow and fatten for market, ought to prove an excellent business proposition.

STOCK FARM AT CULION.

Herewith, marked "Exhibit A," will be found the report of Dr. Harry H. Dell, director of animal industry, who has been in direct charge of the farm for the past seven months. Of course, with Culion so distant and inaccessible, Doctor Dell has been unable to take part in any other live-stock transactions of the bureau. However, through the cooperation of the veterinarians of the board of health and the serum laboratory, the stock has been well cared for and satisfactorily handled. In fact, the bureau's farms are so scattered and transportation so slow that, wherever the station of our expert in animal industry, this service could not be had without the cooperation of the board of health, whose veterinarians and inspectors pretty well cover the islands.

The experience with horses at Culion has been so unsatisfactory that these will be immediately moved to places where experience has shown that they can do better. It is the judgment of the writer that the land on Culion is too poor and rocky and the grasses too large, coarse, and woody to expect the best results for grazing, notwithstanding that this opinion conflicts with that held by Dr. F. Lamson-Scribner, an eminent authority on grasses, given by him at the time of his last annual report.

The Chinese heifers were doing well at the time of my last visit to the place in July; they have not done so well lately, I learn.

There can, I think, be no difference of opinion on the proposition that, in order to justify an efficient management for this place, its operations should be greatly enlarged. There are some 5,000 acres in the valley where the farm is located, naturally inclosed by mountains. It ought to maintain 1,000 cattle better than it does 50, as the larger number would keep the coarse grasses to some extent short, tender and digestible. It should be a cattle ranch, with a a good herder or two, instead of a stock farm. The leper colony on the same island, I understand, expects to have some 6,000 lepers in the course of a few years, and I understand that it is expected to feed them beef. A pound of beef each per week would require the slaughter of an average of some 1,500 head of Chinese cattle a year.

I can not agree that hogs should go there. There is no suitable feed there, and little chance to grow any. Hogs should be kept near a good food supply, or where such can be grown to advantage.

Culion is too inaccessible to make it a suitable object lesson and I believe its operations should be large enough to aid materially in restocking the islands with cattle or to furnish a considerable part of the beef needed by the leper colony.

The following letter was sent to all the farms and stations last February:

BUREAU OF AGRICULTURE,
Manila, February 9, 1904.

SIR: It has been well demonstrated that teosinte, corn for forage, sorghum, sugar cane, etc., can be grown abundantly and cheaply in these islands. Therefore shipments of American or Australian hay to the farms and experiment stations of this bureau must cease at as early a date as possible.

You are therefore directed to multiply the seed of such of these plants as you have or can get, and increase the plantings so as to afford a constant and abundant supply for all animals in your charge. These forage crops may be fed mainly green or partly cured, or during the dry season may be entirely cured and housed for times of scarcity.

Very respectfully,

W. C. WELBORN. *Acting Chief of Bureau.*

As a result the purchases of hay have already practically ceased, except for horses newly arrived. This saves a very large part of the expense of feeding. Later instructions were sent about growing Kaffir corn, corn, etc., and we intend in the near future to displace oats as a part of the ration for horses almost entirely. At two of the farms this has already been done. It is safe to say that our feed bills are now not over one-half, in proportion to the number of animals, of what they were at this time last year. Mills for crushing corn and cob together have been ordered for two of the larger places.

I believe that, unless we can grow feed for our live stock, we had much better import the stock than grow it.

SINGALONG OR MANILA EXPERIMENT STATION.

This station, or trial ground, of the bureau has been conducted under the personal direction of the present chief of the bureau for a year now, and hence no separate report is at hand except notes not in shape for publication. On this station, comprising 10 acres of land, are being tried various forage crops, fruit trees, American vegetables and field crops, fiber plants, etc., and live stock and poultry are also kept.

Among the American garden vegetables that generally succeed at any season, provided moisture conditions are good, may be mentioned okra, eggplant, corn, lettuce, radish, beets, garlic, leek, onion, and pepper. Those succeeding only in the dry, cool season, from November to April, are cabbage, garden peas, tomatoes, turnips, and carrots. Melons and cucumbers do not succeed at all, and I have seen but one good crop of summer squash. Onions have not yet made good bulbs. Asparagus does fairly well all the time, but never sends up as many or as large shoots as in the States. Irish potatoes have not succeeded at Manila, nor at any place near sea level, so far as I have heard.

Okra (the gumbo of the Creoles of Louisiana) is a particularly fine vegetable for this country. It is a vigorous, rapid grower, holding its own against rank grasses and weeds, and makes a constant supply of splendid food easily prepared for the table. It ought to be grown by every native in the islands, and the bureau is now saving large quantities of seed at three stations for distribution.

Orange, lemon, and olive trees have not yet come into bearing. Figs have borne good fruit, and grapes are at this time quite promising. Improved kinds of papaya, or melon fruit, have done remarkably well and are, indeed, a great improvement over the kinds formerly grown here. So prolific is this fruit and so rapid its growth that seed enough to stock the archipelago can soon be saved. Bananas from Hawaii are not to be compared with a few fine varieties common in the islands. Large plantings of alligator pears, a delightful fruit hardly known here, have been made and hundreds of young trees well started.

FORAGE CROPS.

Alfalfa, formerly promising for a short time, has completely failed, not only at Manila, but everywhere in the islands, except at Trinidad, and there it is still doubtful. If the excessive wet weather or the excessive dry weather fails to kill it, the coarse, rank grasses are sure to make quick work of it at times when it is weakened by unfavorable weather conditions. Alfalfa need not be further considered for most of the islands, for its failure has been complete.

Sorghum, teosinte, cane, Kafir corn, etc., themselves giant grasses, inured through past ages to battle with other tropical giants for mastery of the soil, succeed remarkably here. Teosinte has continued to make exceptionally heavy yields, especially in the wet and warm season. It was considerably dwarfed during the cool, dry season, but insufficient moisture was, no doubt, one cause. It is not a drought resister, being too closely related to Indian corn for that. It is greatly liked by horses, cattle, and hogs, when cut green. Several determinations made of the green teosinte as ordinarily cut and fed, showed it to have had but 12½ per cent of dry matter. This would require a horse to eat 100 pounds in a day in order to get the equivalent of a day's hay ration. The person buying teosinte at $10 gold per ton pays $80 gold per ton of dry matter. We need not wonder that the supposed large market for green teosinte has proved nonexistent. As is quite well known, food so succulent as this can not be fed in large quantities to working horses. The "zacate," or green grass, so largely sold in Manila by the bunch or 100 bunches, has been found to weigh, approximately, one-half pound per bunch,

and to contain 14 per cent of dry matter. So the prevailing price of 40 cents gold per 100 bunches makes a ton of dry matter cost $108 gold. The quartermaster who buys zacate at $10 gold a ton pays over $71 gold per ton of dry matter. As wheat bran mashes are well known to produce all the benefits that could be claimed for green grass, and the best bran can be bought on the open market for $25 gold a ton, there can surely be no good reason for feeding zacate at the prices for which it is sold.

SORGHUM AND KAFIR CORN.

One year ago last month a stalk of sweet sorghum, resembling the orange variety, was found growing among some fruit trees. The seed was saved and planted immediately, and all the seed made again planted. As a result, over 60 bushels of seed have been saved, besides some good crops of forage. This plant made good crops all through the dry season without irrigation, and made three crops from each planting of seed before the stubbles were exhausted. From one crop a tenth of an acre produced at the rate of 28 bushels of seed per acre in the midst of the dry season. Another tenth of an acre sown broadcast in June was cut in August and produced at the rate of 18 tons of green forage, and two analyses averaged 28 per cent of dry matter at time of cutting. Another promising crop is coming along from the stubble.

The sorghum not only stands drought better than teosinte, but has also stood the excessive wet weather of the last two months much better. It comes up from the stubble better, the seeds are more abundant and easier to save, it thrives much better on poor land, and makes a heavier tonnage, not of green forage, but of dry matter.

The Kafir corn, which is a first cousin of the sweet sorghum, is nonsaccharine and a much heavier yielder of seed. It possesses all the hardy, drought-resisting qualities of its relative. The grain from this plant, when ground into coarse meal and fed to different kinds of live stock, has been proved to have a nutritive value 80 to 90 per cent as great, pound for pound, as corn meal. Several lots of seed proved bad, and only just now have we a fine crop of Kafir coming to maturity.

Velvet beans are growing with the greatest success. These are a tropical bean, grown largely for live-stock food and land enrichment in Florida and other Gulf States. The vines often grow 50 feet long, and they yield 25 to 30 bushels per acre of beans that make very rich stock food. Our patch, sown at the beginning of the wet season, has the entire surface of the ground covered to the depth of 3 or 4 feet with a dense tangle of vines and leaves that will not permit a spear of cocoa, cogon, or other noxious grass or weeds to grow. They are fruiting heavily, and with the advent of dry weather it is expected that a very fine crop of beans may be gathered. Of all the leguminous crops that draw nitrogen from the air, and hence enrich the land, there is none that I know equal to the velvet bean. I am positive, and shall inaugurate some experiments to prove it, that a good crop of velvet beans during the dry season on rice land will double the rice crop of the wet season.

Japanese soy bean, or soja bean, is now coming to maturity and promises a fine crop. This is a variety of the oil bean so largely

grown in China, and it makes a still more nutritious stock food than the velvet bean. It matures quickly, but does not make the dense growth of vine and leaf which characterizes the velvet bean.

Sulla, or Egyptian clover, and all American clovers tried, have failed as completely as alfalfa.

New barns and sheds have been erected within the last year, and machinery, tanks, and pipes have been installed for irrigation. It has been found that the water supply is not sufficient, and the boring of an artesian well has been recommended.

I consider this station quite creditable in every way, and it certainly affords an object lesson of great interest and value.

SEED AND PLANT INTRODUCTION.

Prof. W. S. Lyon, in charge of seed and plant introduction, is in America on leave of absence. His assistant, José Ma. de Marcaida, makes a report, marked "Exhibit B," herewith appended.

The following letter is one of many, showing that this work is of value and is appreciated:

CAMP VICARS, MINDANAO, *August 19, 1904.*

The CHIEF, BUREAU OF AGRICULTURE,
Manila.

SIR: I think that for the most part conditions were favorable. However, about April 10 there came a dry spell, lasting nearly two weeks. This retarded everything in its growth. In this section it is almost impossible to irrigate to any extent.

During the past two weeks, though, rain has fallen much. I have been able to get seeds to germinate, though the ground is so cold at this altitude that plants grow very slowly.

Judging from my experience, I should say any time from December to May ought to be a good time to plant. The natives raise corn and squashes at almost all seasons.

Plants, except lettuce, are slow in producing seed. Quantity of seed is small. My lettuce produced much seed, which was scattered by wind and rain, so that quite an area, comparatively speaking, is covered with young plants. One radish left for seed (sown February 3) has reached a height of 6 feet 6 inches and diameter of more than 4 inches. Will send photo later.

These conditions apply to a large area around the lake—Lake Lanao—but would not be so for lower altitudes near here, because the soil there is mostly volcanic sand.

However, to cultivate much of this lake country will be difficult unless the Moro has knowledge and tools with which to conquer the cogon grass. It is this grass which has caused the Moro to leave his fields and clear new ones, because they were unable to keep it down.

The native in this section appears much interested in agriculture. Many of them seem to admire very much my garden, and it serves as the best of object lessons.

Very respectfully,

HARRY A. EATON,
Captain, Twenty-third Infantry.

When this work first began nearly all seed sent out failed to germinate. Seeds are very likely to lose their germinating powers on their way here from the States. Now all seeds are tested before being distributed, and very few fail to germinate on reaching the people. I feel sure that, owing to inexperience at first, seeds were sent too indiscriminately. They were being sent without reference to soil, altitude, or season. We are now beginning to know enough to send seeds at their proper seasons and under conditions that promise success.

I am sure that fewer seeds (in volume at least) should be imported in the future. Our stations are already growing many kinds successfully, and the Trinidad station, in particular, is admirable for growing most of the staple kinds of vegetables, commonly successful in temperate climates.

BATANGAS STATION.

Owing to Mr. Shipley's resignation late in the year, no separate report in shape for publication has been rendered. The chief of the bureau visited the station in July and found it in quite promising condition and in every way a most attractive object lesson for the province in which it is located. The soil is decidedly better than the soil at Manila. Here I saw the best American corn I have seen in the islands, far surpassing anything the people had ever seen. Teosinte and other forage crops were also good. The sales of forage, corn, vegetables, etc., seem now to be running at a rate about meeting the expenses of the station.

COTTON.

Seven hundred pounds of seed cotton to the acre was grown there the past season. This is more than the average in the United States, and the quality was as good as a good upland kind in the States. Cotton and cotton goods constitute an immense item in our imports. An acre's yield at this rate ought to be worth some $32 at the present price of cotton.

At the time this cotton was gathered it looked as if the stalks might yield as much more, but it did not make another pound. An insect (I think a species of Mexican boll weevil) got numerous enough to destroy every young boll. At the Singalong station no cotton was made, on account of this same insect, so far as I could observe. In Negros no cotton was made.

At San Juan de Boc-boc, Batangas, where the bureau distributed seed and placed a hand gin, about 30,000 pounds of lint cotton have been made.

I am now of opinion that a quick-maturing variety of cotton may make a fair crop, as in Texas, before the weevil has time to become numerous enough to do much harm. Then, if stalks are cut and burned, another crop may be planted at the proper time the next year. If correct in this, it would mean that different varieties should not be planted near each other and that successive plantings should not be made of the same variety. It might be that the insect could be destroyed by killing for a year all perennial bush cotton in the islands and planting no other cotton for that period. This would certainly be a great cotton country but for this insect.

The Batangas station was growing some as fine Spanish peanuts as I have ever seen in the United States.

Buildings, live stock, and everything at this station were well kept and attractive in appearance. Substantially the same experience with vegetables as mentioned for Manila has been had at Batangas.

COFFEE PLANTATION.

The manager of the Batangas station also superintends the working and care of the Lipa coffee plantation, several miles away. The chief of the bureau visited this coffee plantation also, and found 10 acres of promising young trees, free from any sign of disease.

Probably the market prices in the Philippines are twice as high as in the United States, yet at one time Batangas, in particular, grew

rich on coffee. Disease and insect enemies cleaned the coffee trees out so thoroughly that it is believed they in turn perished from the land. To revive this once great industry is the purpose of the coffee plantation.

Batangas is perhaps the best live stock province of the islands. The bureau will place some horses and jacks there for breeding purposes in the near future.

TRINIDAD AND BAGUIO.

The last annual report details the difficulty of growing vegetables on the Baguio soils. Other trials were made in May of this year and, although no great success was met with, owing to heavy rains which soon followed, it was well demonstrated that there are no poisonous substances in the soil and no missing element to cause sterility. The soil seemed to have been broken too deep and was too loose and incoherent—a marked tendency of this soil. With the advent of dry weather, other plantings will be made and success will be certain with the use of some fertilizers. The soil is not rich naturally. The writer found growing on the Baguio soils in May last some magnificent cabbages, turnips, tomatoes, potatoes, garden peas, radishes, beans, etc. Native planters were growing these and, in every case, had broken the soil to a moderate depth—3 or 4 inches—and had used manure.

In the Trinidad valley the land is naturally much richer. In this valley I have seen finer English peas and cabbages than I have ever seen in any other country. The peas in some cases were 10 feet high and loaded with full pods, and cabbage heads often weighed 18 pounds. Here I also saw American onions producing large bulbs.

At our station there, without fertilizer or irrigation, we grew at the rate of 100 bushels of Vermont potatoes per acre, while the native Irish potato, having been planted earlier so as to suffer less from drought, probably did better. Here pumpkins, carrots, squashes, beets, spinach, parsley, kale, eggplants, beans, tomatoes, radishes, lettuce, cauliflowers, and nearly all ordinary vegetables grow to perfection in the dry season with some irrigation, which is now abundantly provided for. White clover, red clover, and alfalfa were also doing well when I was there in May, but, from reports, the white clover and alfalfa have not done well through the wet season.

Oats make fine crops there, and it is supposed that barley, rye, and wheat would also. It is almost too cold for teosinte, sorghum, and corn to make the rapid growth they do in a low country, but they are reported as doing fairly well when the weather is not too cold and wet.

Additional teams, tools, laborers, etc., have been sent there, with a view to putting into cultivation quite 40 acres during the approaching dry season. It is planned to put the bulk of the increased acreage in oats and such staple vegetables as potatoes and cabbages.

Quite a large business was done the past season in fresh vegetables for the civil sanitarium, and with families visiting Baguio during the heated season. It is expected, as soon as this demand has been fully supplied, that the surplus can be sold profitably to the Benguet road people not far away.

The many varieties of fruit trees and grapevines from America came very near dying the last dry season, before water was gotten

on the land; but now I learn they are taking on new vigor. None have reached the bearing age as yet.

With transportation into this elevated mountain region so that fertilizers may be carried in and products shipped out, there is no doubt but that the greatest abundance of potatoes, cabbages, and all kinds of garden vegetables may be made to supply the Manila market and the various army posts in the islands.

RICE FARM.

The difficulties met in selecting a site for the rice farm were discussed in the last annual report. This farm is poorer than most of the rice lands of the islands, and is not as level as it should be to give the best results. It requires too much labor in the construction and maintenance of so many dikes to flood the land properly, and these numerous dikes interfere in great measure with the work of labor-saving implements and machinery.

About 1,000 acres of land in the tract is capable of being put under cultivation. Fully 800 of this has been cleared, diked, and for the most part planted. About 600 acres, it is now estimated, is in growing rice, and 200 more will be put in by the middle of October, when the season for planting is over.

The last wet-season crop, which is the crop mainly relied upon in this section, consisted of only about 30 acres, on which the yield was very good. A crop of some 400 acres of off-season rice was put in for the dry season. This was all planted in a quick-maturing Japanese seed that had never been tried here. It proved a great mistake, as the Japanese rice did not produce 20 per cent as much as the regular Filipino dry-season rice, called by the natives inita. This native rice is a strong, vigorous grower, strong enough to fight its way among tropical grasses, and is in every way better than the Japanese kind tried.

TRANSPLANTING RICE.

The natives universally start their rice in seed beds in June and July; they prepare their land as fast as they can by plowing and harrowing in mud until the middle of October, and as fast as they get a piece clean, set the young rice about 9 by 9 inches. This plan is well-nigh universal in oriental countries. The reason for this plan, no doubt, grew out of the fact that, by setting rice 6 weeks old and 10 inches high in freshly cleaned land, it more easily keeps the mastery over the noxious grasses and weeds. Then, with rice of such height, irrigation water can be put on the land much earlier and deeper, and thus keep the weeds and grass down. With the slow and faulty way of preparing the land, practiced in the islands, it is quite likely that rice seeded in the American way at the beginning of the wet season would make but little crop.

We have fully tried the native's plan of setting rice, having put in several hundred acres in this way. We find that $1 gold will take up the plants and transplant an acre. We also have several hundred acres seeded in the American way, which are in every way promising. The transplanting enables us to lengthen the planting season by six weeks.

other crops. Another short-season rice crop might be grown, or, what would be better, perhaps, a crop of velvet beans, peanuts, soy beans, cowpeas, or other crop which, besides yielding profitable returns, would also enrich the land for the main rice crop.

Several steam thrashing outfits have either been ordered or are in contemplation. One curious trait of the Filipino seems to be that he is willing to buy what he has actually seen to be good. But one need not talk to him about any improvement or addition to what he has not seen. He will believe none of it, and wants what he has seen demonstrated—no more and no less.

It is often charged that the Filipino will not work and hence will never develop the country. I believe he now expends enough energy (largely unprofitably spent, carrying heavy burdens long distances, tramping out rice, cleaning it in mortars, and doing all manner of hard work in the crudest way) to make the country a garden if properly directed. With steam thrashing and cleaning of the main crop of the country, a long step in the right direction will have been taken. Exhibit C is the report of the acting superintendent.

STEAM PLOW.

The bureau expects a steam plowing outfit, including ditching and grading machinery, to arrive by November 1.

It is a curious fact that, though there are rivers of water going to waste everywhere in the islands that could irrigate thoroughly every acre of land, yet I do not believe that 3 per cent of the good land has artificial irrigation provided for it. With proper machinery for ditching and grading, hundreds of thousands of acres (now partly sterile in the dry season and more or less uncertain all the time) may have abundance of water conducted over them at a mere trifle of cost.

With a steam plow we will be able to cultivate much more land than we now have available at Murcia. The following letter will give my views with regard to moving from the present farm, which is only rented:

BUREAU OF AGRICULTURE, *July 19, 1904.*

SIR: In connection with the proposition to buy a steam plowing outfit, I am much impressed with the unusual advantages for rice growing of certain low, level lands lying along the railway between Apalit and Santo Tomas, extending in a northeasterly direction from the railroad. I had occasion to see these lands on Sunday, when the Pampanga River was at its greatest height from the effects of the recent flood. The Pampanga River extended from below Malolos to San Fernando, a distance of probably 15 miles. All of the land covered by this overflow water lies much higher than the particular lands of which I speak, yet the lowlands were not overflowed at all and had not been. This proves that the work done by the province in building up the dirt road, forming a sort of levee for the Pampanga River from Calumpit to probably Arayat, has proved effective in keeping the flood waters in the river (at all points above these lands).

So far as I can see, this is conclusive proof that these lowlands will hereafter be entirely safe from destructive overflow. For many years they have been subject to such inundations that nobody would cultivate them. The continual deposit of sediment from overflow waters has no doubt made them very rich. I believe that this land could produce over twice as much rice as the thinner lands of Murcia will produce. So far as I can see, these lands are more nearly level than any other land that I have seen in the islands.

If the bureau had from 2,500 to 4,000 acres of this land it could, in my judgment, be made the prettiest proposition in the Philippine Islands, excepting perhaps a model sugar plantation and an up-to-date sugar factory.

The land of which I speak is considerably cut up by esteros, and the fresh water from the Pampanga River is backed up by the tide generally to within about a foot of the surface of the ground. By damming up these esteros along the line of the railway, leaving gates so

that the tide water could be shut into the farm, pumping and irrigation at all times woul remarkably easy and cheap. These same gates would enable us to shut out any sea w blown in during the typhoon season. They would enable us, moreover, to shut out the t at any time when good drainage is needed on the farm.

Señor Buencamino says that large areas of this land are public, but Governor Joven officials at Bacolor think that it is private land. Governor Joven says, however, tha feels sure the parties owning it would give the government free use of it for ten years for reclamation work that the government would do.

In view of these conflicting opinions, I would recommend, therefore, that steps be ta to search the records and find out if this land is really public or private. I would sug that a representative from the bureau of public lands or from the office of the enginee the Commission be detailed to go to Bacolor and, if need be, to make preliminary surv so as to establish the boundaries of any land likely to prove public.

Very respectfully,

W. C. WELBORN,
Chief of Bureau

THE SECRETARY OF THE INTERIOR, *Manila.*

In addition to what was said in above letter, I may state that t Hawaiian Islands produce 8,000 pounds of rough rice per acre annum in two crops. There are lands in these islands, I am relia informed, that sometimes produce 4,000 pounds per acre in the sin crop grown, i. e., 100 cavans[a] per hectare (about 2½ acres). Wit steam plow and the animals now on the farm I should like to ha 3,000 acres of this land. With a yield of only 1 ton per acre, half t estimate of the single crop as above, $60,000 gold outturn wo result. Rough rice probably can not be worth less than $20 to $ gold per ton until the $12,000,000 worth now imported shall be su plied by home production.

Having found considerable market in Manila for rice straw at $ gold per ton, the bureau now has at Murcia a first-class straw bal As it costs about $3 a ton to bale and ship it to Manila, we expect add at least $5 gold net to the outturn of each acre of rice harvest

SAN RAMON FARM.

The report herewith, Exhibit E, of the San Ramon farm, Zamb anga, Mindanao, is not as full as I should have desired, but time a means of communication would not permit a fuller report to be gott after this one was received. There is in the neighborhood of 2,0 acres in San Ramon of rich soil. From the reports as to number plants of cocoanuts, abaca (Manila hemp), cacao, etc., it may judged that not more than 9 per cent of the available land is in cul vation, and that not 3 per cent of the whole area has been gain to cultivation since American occupation.

This unfavorable showing has no doubt been caused largely scarcity of animals, there being barely enough to do more than ha in the cocoanuts and other products and load the copra and hemp shipment. This situation was unfortunately made worse by a sh ment of 40 carabaos to the place about a year ago, which were aft wards found to be infected with surra. It not only rendered the well-nigh useless, but also those already on the place. These infect animals have now been cleaned out and 20 oxen have been sent the which certainly can do as much work as 50 carabaos.

In my judgment, a steam plow should be sent to San Ramon a hemp and cocoanuts planted to the extent of 1,000 acres at least

[a] A cavan equals about 100 pounds.

the next two or three years. This place is too large and fertile to be run in a small and merely experimental way. It should be pushed and made to yield large profits. There is an immense amount of wood suitable for fuel that is now thrown away in clearing the land.

During my visit to San Ramon in April I saw some very pretty object lessons demonstrated. The immense superiority of planting hemp in rows and cultivating over planting in a haphazard fashion and working once a year with hoes and bolos was shown. The same may be said of young cocoanut trees. The very common practice of planting camotes (sweet potatoes) between the hemp plants to keep down weeds and furnish food to laborers was shown greatly to retard the growth of the hemp plants as compared to working with cultivators. The hemp and cocoanut plants appear to need plowing, cultivating, irrigating, and perhaps manuring for their best development, just as a young orchard does in the States.

A beautiful river runs through the estate to the sea. Had irrigation been provided during the drought of 1892 and early 1893 the effects thereof would never have been felt.

I believe San Ramon should be equipped with better drying arrangements for its copra—perhaps a machine drier. The present arrangement for drying by smoking is crude and laborious, making the value of the product somewhat less than if it were properly dried. With an estimated output of 300,000 nuts the present year, and rapid increases each year as young trees come into bearing, this addition to the equipment would prove a measure of great economy.

The fiber of the cocoanut is a product of great value in the world's markets, being worth from 2 to 6 cents gold a pound, according to quality. Six nuts are estimated to yield a pound of fiber. At 5 cents gold a pound, a price that was paid in this market the last year, San Ramon could turn out $2,500 gold worth of fiber from 300,000 nuts. Some fiber-cleaning machinery should be placed at San Ramon, as adjoining plantations have more husks going to waste than we have. If all the husks in the islands were cleaned and sold at 3 cents gold per pound an item of $2,000,000 gold would result. So far there has been no business done in cleaning the fiber in the islands except that a little is soaked and beaten clean with clubs.

THE AGRICULTURAL COLLEGE AND EXPERIMENT STATION IN NEGROS.

The construction of the new buildings for the college is entirely in the hands of the insular architect, and, I understand, work will begin as soon as the rainy season is over. Plans have all been made and approved, money appropriated, etc.

La Granja, the college farm, is a large one, about 1,900 acres in extent. The land is very fertile, and enjoys one of the prettiest locations I have seen in the islands.

From the report of John Heil and Harry Anthony (Exhibit F), it will be seen that some 250 acres have been put into cultivation. A year ago, when the writer first visited the farm, very little had been accomplished. There were very few animals and very little means for doing work, except a good, large list of salaried men.

This place, like San Ramon, is too large and rich to use exclusively for experiment and demonstration. It should also be used to produce revenue.

Sugar cane, under present conditions, seems to be the most prom
ing crop for this place. This is in the best sugar region of the islanc
It is too dry at times for hemp to do as well as at San Ramon. It
too far inland for growing fruits or perishable products for mark
It yields corn well, but there is no market for corn of considerat
consequence. Corn will have to be kiln dried, most likely, to enat
it to be handled in a commercial way as in the States. All lar
forage plants, such as sorghum, teosinte, etc., flourish in this ri
soil and, of course, will be fine for maintaining our stock; but it
certain that for eight or nine months in the year these plants cou
not be cured into hay. so as to make a commercial product of the
For all kinds of stock raising this place would be excellent, if only t
fatal diseases could be gotten under control.

The islands export $4,000,000 gold worth of sugar per annu
The majority of this comes from Occidental Negros, and La Gran
is near the center of this large industry. An object lesson in up-t
date sugar methods is sorely needed. The mills generally in use a
fifteen to twenty years behind the times. It is variously estimat
that only 50 to 60 per cent of the juice is extracted by these miserat
excuses for mills.

The entire juice, after liming and a little skimming, is boiled dov
into a solid mass, and is powdered up and called sugar, that is, the
is incorporated in this sugar 20 to 25 per cent of molasses that cou
not be crystallized and hence has to be thrown out at the refiner

Three samples of Negros sugar sent by us to the Governme
laboratories for analysis showed an average of 78.7 sucrose or cryst
lizable sugar, 7.2 glucose or noncrystallizable sugar, and 1.41 per ce
of ash. When it is remembered that every pound of glucose preven
from 1 to 2 pounds of cane sugar from crystallizing, and every pou
of ash from 4 to 5 pounds, it can be seen why this so-called sugar
low in price. It will fully explain why this sugar is worth only 1
cents gold in Iloilo, while 96° centrifugal sugar should be worth 2.
cents gold, for shipment to the United States. A modern sug
factory turns out about 90 per cent of its product polarizing 9
So the sugar planters undoubtedly lose over one-half of the possit
values of their sugar cane.

Their economy, or rather want of economy, on the plantation
just about as marked as in the mill. Very small, steel-pointe
wooden plows and carabaos scratch an acre in four to six da
After about the third scratching, interspersed with a good deal
digging and burning of larger weeds, the land can be planted. Eve
operation on the plantation seems to be done by the slowest proce
I have seen a force of 60 men working in the yards of a small mi
sunning the bagasse to get it dry enough to burn. In modern plan
even after mixing considerable water with the bagasse between t
different sets of rollers, the resulting product is always dry enou
to burn and make all the steam necessary.

La Granja has one of the old Spanish mills. It is capable
recovering half the values out of perhaps 150 acres of cane. So
limit will about be reached the coming grinding season. The larg
the capacity of such a mill as we have, the more money will be l
growing cane for it and running it.

There is one important item of economy that the Negros plant
has down to a fine point. The average laborer does not receive qu

16 cents gold a day in money and food combined. I have seen 50 and 100 sitting on their tools waiting for daylight to begin a day's work. Perhaps the desperate straits of the planters, owing to poor methods, compel such low wages.

Exhibit G comprises the report of the soil physicist, A. M. Sanchez, and is largely devoted to a description of certain explorations in Benguet, Cagayan, Isabela, and Union provinces, and to a history and description of the methods of cultivation of tobacco and other crops in these districts. Physical and chemical analyses of soil samples are presented and compared with the composition of soils in certain areas in the United States.

FIBER INVESTIGATIONS.

Exhibit H contains the report of H. T. Edwards, fiber expert of this bureau. In this report is detailed the work that has been done looking to encouraging the production of better qualities of fibers, the invention of a hemp-cleaning machine, the analysis and utilization of the wastes from cleaning the fibers, the introduction of machinery for cleaning maguey or sisal hemp, kapok, etc.

It may be said that in the districts devoted largely to growing the Manila hemp (abaca), the production has almost reached its limit, owing to the available labor supply. One laborer, who must be an expert to do the work at all, averages about 25 pounds a day of cleaned, dry hemp. The owner of the hemp plantation must give from one-half to two-thirds of the outturn to get his plants out and the fiber extracted and gotten ready for market. Even at such cost, hemp is annually rotting for the want of labor to clean it. With such a demand for all the available labor to do this work, more and more very poorly cleaned fiber comes to the market.

When it is remembered that a successful cleaning machine, if manufactured in sufficient numbers, might go into the hemp plantations and demand a tribute of one-half of the $22,000,000 gold worth produced, it can be seen what an inducement awaits invention in this direction. It is certain also that a successful machine will soon result in doubling the output and, by improving the quality, will double the demand for this, the best of the world's fibers.

I have taken particular interest in investigating the possible values of abaca waste for paper making. There must be 150,000 tons of this material (dried weight) rotting in the islands annually. Its analysis shows it to possess fiber in amount very nearly equaling esparto, so largely used in Europe.

I can see no reason why the material other than cellulose in this waste should be any more difficult for the paper maker to get rid of than the same class of materials in esparto or wood pulp. We have found this waste remarkably easy to dry. With a value equal to esparto, the hemp waste would represent an item of $3,750,000 gold.

The manager of the San Ramon farm has been directed to send large quantities of the dried material here as early as possible for forwarding to different paper factories for trial. With good sources of supply of raw material, paper factories ought to be fine investments here, considering that a half million gold represents the annual imports of paper, and that the prices to consumers must be 50 per cent above those of the United States.

Maguey or sisal hemp grows perfectly well in these islands. Th fiber is cleaned entirely by machinery in countries making a busine growing it. Considering the uniformly good quality of the sisal a generally poor quality of Manila fiber, the former sells for quite high an average price on the London market and very nearly so the New York market.

Maguey is admirably suited for the sections having a long d season, where Manila hemp would not grow. In these sections lab is abundant and cheap. With good machinery, the fiber can extracted for a mere fraction of its value, instead of having to gi one-half or two-thirds for cleaning.

The bureau has ordered a machine for cleaning this fiber, and also machine for cleaning kapok or tree cotton.

The tree cotton is a very valuable material for upholstery wor Although growing everywhere in the islands, it has never enjoy more than a local demand at a low price, while the United Stat imports over $100,000 worth at over 20 cents gold a pound for t cleaned cotton. The seed are also about as valuable for oil a fertilizer as the real cotton seed. With a profitable market esta lished for this product, a very large business would doubtless resu

A report is herewith presented (Exhibit I), made by Prof. W. Lyon some time ago, in regard to the cocoanut, copra, and cocoanu oil industry. The copra, or dried meat of the cocoanut, is the seco largest export from the islands. The oil industry so far has n been able to thrive in competition with the buying and exporting the copra. The cost of packages for the oil, and the low value he of the press cake, are sufficient reasons for the failure of mills maki oil for export. In production of oil in a large way for local consum tion, the slow means of distribution and the readiness with whi the oil becomes rancid make this unprofitable.

To refine the oil and make it into a solid fat resembling butter a lard will afford the only opportunity I see for working the cop profitably here. It has been known for years that an immen business of this kind has flourished at Marseilles, and later the bu ness was taken up in Germany and England. The secret was close guarded, and only lately have we been able to get quotations on t machinery and the process.

About $250,000 worth of lard and $65,000 of butter are import into the islands annually, and it is most certain that no compou lard comes in at a less cost to the jobber here than 10 cents gold pound. At this price for cocoanut lard the value of the copra treated would be very nearly double the present high price it bringing for export.

Until the demand for lard and butter now imported is met by loc production very large profits may be made in this line of business.

OTHER INVESTIGATIONS.

The cassava (Manihot utilissima), the sole source of the tapio of commerce, grows all over the islands. No use has ever been ma of it except as a famine food occasionally. In Florida large star factories have been erected to convert it into refined starch. In t East Indies, the chief source of the tapioca supply of the Unit States, this product sells for 1½ cents gold a pound. In these islan starch is worth 4 cents gold at first hand and tapioca still more.

The reports from other tropical countries indicate that 10 tons is a fair expectation of yield for an acre. These reports, and analyses we have had made here, indicate that 25 per cent of the weight of the roots may be recovered in pure starch or tapioca. With suitable machinery for working the roots, it can be seen that an immensely profitable business might be done up to the point of supplying all the home demand.

Experimental plantings of cassava have been made for further investigation.

INDIAN CORN.

Some small corn mills for making corn into meal for food have been ordered to be placed in the provinces for the use of the natives. Although corn is quite largely grown, it is roasted at about the time it is getting hard and eaten off the cob. Occasionally it is shelled and parched. In one or two instances I have heard of a coarse meal being made by rubbing the corn between stones.

Corn is capable of maturing a crop in less than three months. Corn meal, pound for pound, is a little more nutritious than rice, by reason of a larger content of oil. It is also slightly richer in protein, and a slightly better food to be eaten alone. The average rice crop, requiring six months to grow, does not yield over 750 pounds of cleaned rice per acre. Corn crops here, I believe, average 15 bushels, which is more than the equivalent in food value of a rice crop. By knowing how properly to utilize the corn crop it would seem enough ought soon to be raised to avoid any necessity for importing rice.

CASTOR BEAN.

The castor bean grows wild all over the islands. No use whatever is made of the beans, while much oil is imported at a high price. Investigations have been made as to the oil content of the bean and the fertilizing value of the cake and the husks of the bean. The castor cake is not a good feed stuff, but is worth some $20 gold a ton as a fertilizer. The plants here grow to be almost trees in size, and hence it is believed the stalks would make splendid fuel in many older sections, where fuel is scarce and high in price.

Investigations have also been made as to kind and cost of milling plants necessary to handle this product. This industry is one well worthy of exploitation.

The lumbang, or Chinese candle nut, the fruit of a forest tree, is now pressed for oil in a crude way in a few places. The physic nut is another nut quite rich in oil, but so far is not handled at all for this purpose.

TANNING AND LEATHER.

It seems strange that there are not up-to-date tanning and leather working establishments in the islands. The people here seem to take very readily to work of this kind. The islands import some $700,000 gold worth of leather and leather goods, that seem to sell at prices fully 50 and often 100 per cent above States prices. These leather goods and leather come largely from countries themselves paying heavy duties on imported hides, and then the leather and leather goods pay another heavy duty on entering here. Our forests are no doubt rich in the most excellent of tanning materials.

LECTURE WORK.

Plans are being made to begin some farmers' institute work, and perhaps some demonstration work in the different provinces. A lantern outfit and views are being arranged for this work.

SHEEP AND WOOL.

There must be several hundred thousand inferior sheep in the islands. So far as could be learned, nobody has ever sheared a sheep or sold a pound of wool. The bureau has bought a lot of shears, and is distributing them among sheep owners who will agree to use them. Quite a supply of wool may result for export, or the natives may learn to spin and weave it, as they do cotton and many other fibers.

LIBRARY.

The bureau has lately arranged a system of filing and indexing all publications received. It is making an effort to get complete files of the publications of all stations in the United States and other countries.

PUBLICATIONS.

Following is a list of the publications issued by the bureau during the year ended August 31, 1904:

Bulletin No. 5. List of Agricultural Products and Fiber Plants, by F. Lamson-Scribner (Spanish edition).
Farmers' Bulletin No. 4. Preliminary Report on the Commercial Fibers of the Philippines, by John W. Gilmore (in Ilocano dialect).
Farmers' Bulletin No. 5. Cultivation of Tobacco, by Clarence W. Dorsey (Spanish edition).
Farmers' Bulletin No. 9. Algunas Sugestiones sobre el Cultivo del Algodonero, by W. C. Welborn (Spanish edition).
Farmers' Bulletin No. 10. Maguey in the Philippines, by H. T. Edwards (English edition).
Farmers' Bulletin No. 11. The Jute Industry, by W. S. Lyon, in English and Spanish (in the hands of the printer).
Farmers' Bulletin No. 12. Abacá, by H. T. Edwards, in English and Spanish (in the hands of the printer).
Press Bulletin No. 1. Maguey Cultivation in Mexico, by W. C. Welborn (in English and Spanish).
Press Bulletin No. 2. The White Cotton Tree, by H. T. Edwards (in English and Spanish).
Press Bulletin No. 3. Abacá Cultivation in Southern Mindanao, by H. T. Edwards (in English and Spanish).
Press Bulletin No. 4. The Relative Use of Abacá and Sisal for the Manufacture of Binder Twine, by H. T. Edwards (in English and Spanish).

In addition to the above, second editions of Farmers' Bulletins Nos. 1, 2, 3, and 4 have been issued and third editions of Farmers' Bulletins Nos. 1 and 4.

Bulletins are now under consideration dealing with fertilizers, and fertilizer materials and feed stuffs available for the islands, both by the chief of the bureau. The great amount of other work rendered their earlier preparation impossible. The assistant chief of the bureau is now on his way here, and bulletins on these two important subjects will receive early attention.

In the conclusion of this report I wish to make acknowledgment of the great assistance received from the bureau of government laboratories, the bureau of public health and quarantine, the coast-guard



PLATE I.—PHILIPPINE METHOD OF THRESHING RICE, GOVERNMENT RICE FARM, MURCIA.





PLATE II.—PHILIPPINE METHOD OF THRESHING RICE, GOVERNMENT RICE FARM, MURCIA.





PLATE III.—PHILIPPINE METHOD OF THRESHING RICE, GOVERNMENT RICE FARM, MURCIA.



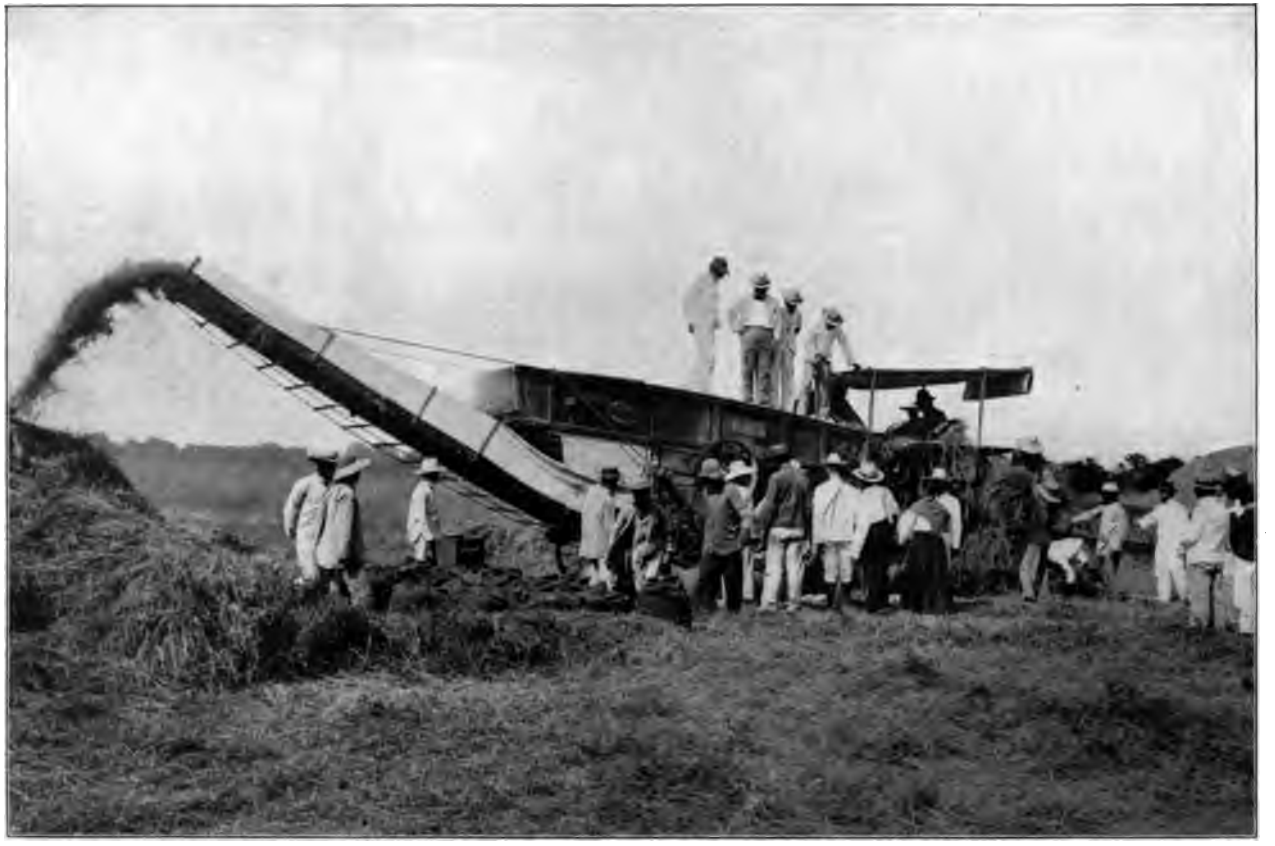


PLATE IV.—THRESHING RICE WITH AMERICAN MACHINERY, GOVERNMENT RICE FARM, MURCIA.



PLATE V.—WORK ON THE GOVERNMENT RICE FARM, MURCIA.





PLATE VI.—NATIVE METHOD OF WEEDING RICE, GOVERNMENT RICE FARM, MURCIA.

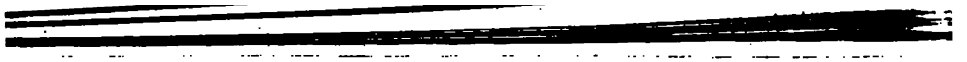




PLATE VII.—IRRIGATING RICE ON GOVERNMENT RICE FARM, MURCIA.



PLATE VIII.—GROWING RICE ON GOVERNMENT RICE FARM, MURCIA.

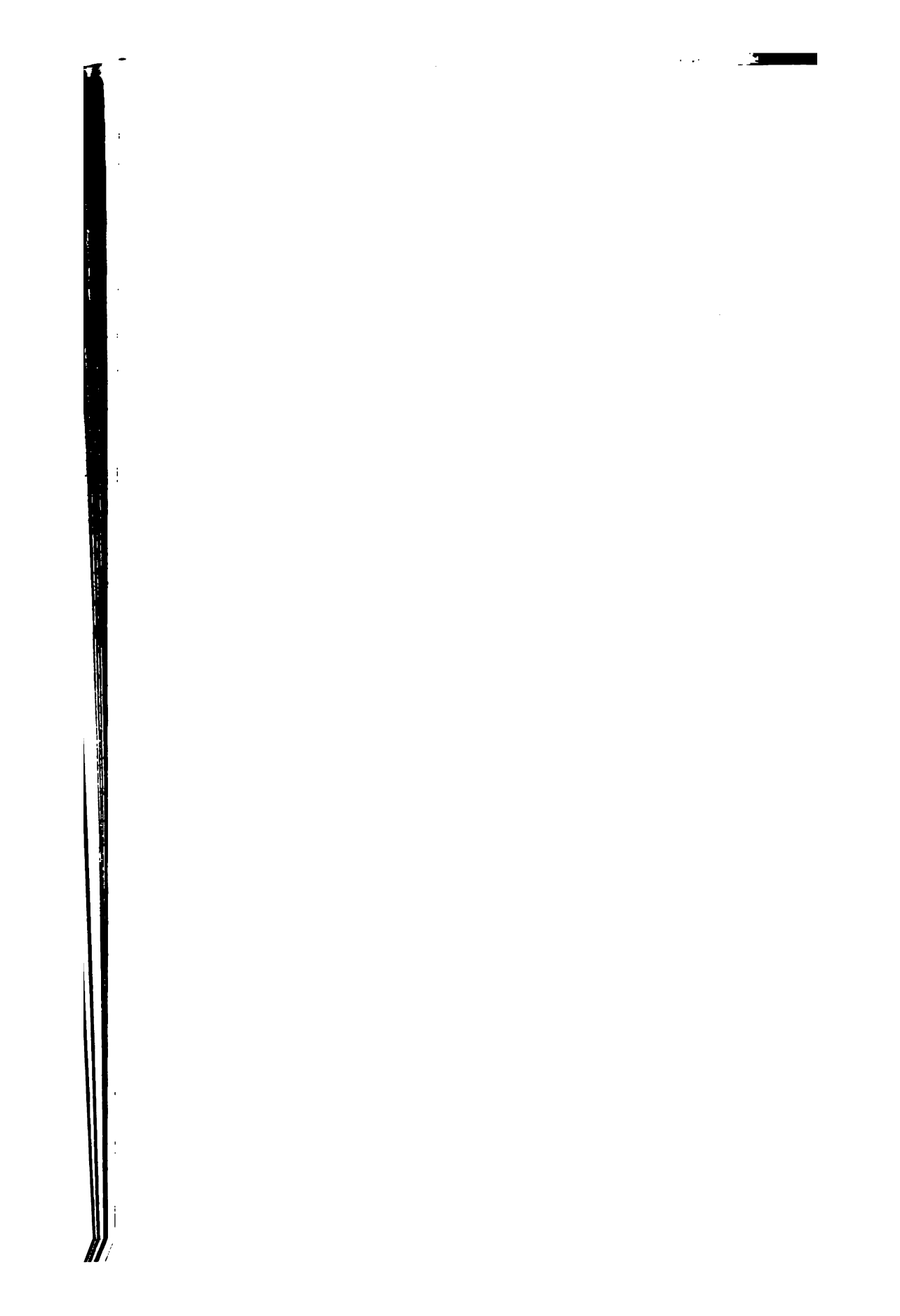




PLATE IX.—CHINESE CATTLE DRAWING GANG PLOW, GOVERNMENT RICE FARM, MURCIA.



PLATE X.—PAPAYA TREE IN BEARING, SINGALONG EXPERIMENT STATION, MALATE.



PLATE XI.—CABBAGE PATCH, SINGALONG EXPERIMENT STATION, MALATE.

service, the insular purchasing agent, and other bureaus of the service. I would commend also the employees of this bureau, both American and native, for loyal, enthusiastic, and capable service.

Very respectfully,

W. C. WELBORN,
Chief of Bureau.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

EXHIBIT A.

REPORT ON GOVERNMENT STOCK FARM ON CULION ISLAND.

HALSEY HARBOR, P. I., *August 31, 1904.*

SIR: In compliance with your request of July 16, I have the honor to submit herewith a report of operations at Government Stock Farm for the year ending August 31, 1904.

I am unable, however, to give a complete report of the work previous to February 9, as I did not assume charge of the farm until that date, and have been compelled to base that portion of the report upon observations made during two visits to the farm—the first in September, 1903, and again in January of the present year.

By direction of Professor Scribner, the then chief of the bureau of agriculture, I visited the farm in September, 1903. At that time the buildings and fences had just been completed, and preparations were being made for cutting the hay.

The buildings consisted of nipa houses for the farm manager and his assistant, and the native laborers; a granary and workshop of matched lumber, with galvanized-iron roofing; and a stable, 145 by 25 feet, consisting of posts of palomaria and galvanized roofing.

The nipa houses are all in bad condition, underpinning, small flooring, and roofs needing renewal. The granary and workshop are also in bad condition, and much labor and annoyance are caused during the rainy season in endeavors to keep the contents dry.

The stable is the most permanent in construction of the farm buildings, but the arrangement could be improved, so that more animals could be housed with comfort, and their feeding and care rendered less laborious. As a shelter during the dry season it serves the purpose, but is wholly inadequate in the rainy season to protect the animals from the inclemency of the weather.

About 1 mile of wire fencing requires renewal. One section was examined this morning. Of 17 posts 5 will sustain the wire for probably three or four months longer, but the remainder have all rotted or been invaded by ants, until they are completely broken off.

Two days after my arrival in September, the steamship *Francisco Reyes* brought to the farm 14 head of native mares from Manila. The herd originally consisted of 17 head, but 3 died from and 4 were affected with hemorrhagic septicæmia when I left Manila. The animals reached the shore in an exhausted condition, and 1 died during the night. The others were placed in an inclosure, from which their bodies were removed one by one, until all had succumbed to the disease previously mentioned.

About 60 head of Chinese heifers were on the farm at that time, including 1 of Indian breeding. No breeding had been done, owing to the immaturity of most of the animals and the fact that the improved sires expected from the United States had not yet arrived.

Some 7 mares of American, Australian, and native breeding, 5 mules, and 1 Arabian stallion completed the list of live stock. Some of the mares had been bred to the stallion, but were being returned more or less regularly for service.

A barge, 18 by 8 feet, had been built for loading and unloading stock, and a stone pamtalan had also been constructed.

During my visit to the farm in January, I found that a hay shed had been erected and about 25 tons of hay had been put up for forage during the dry season. A small nipa dwelling had been built about 3 miles from the other farm buildings, and a boathouse had been located at the end of the pantalan.

Assuming charge of the farm on February 9, I brought with me Woodlawn, the imported Jersey bull, and Sunny Jim, a grade bull of Australian breeding. The stock in the farm was in poor condition as the result of parasitism, internal and external, and the innutritious nature of the pasture at that time. Ticks (*Boophilus australis*) infested both horses and cattle, every animal being the involuntary host of hundreds, except the 1 mule on the farm. For some time every animal was gone over daily, the larger ticks picked off and

destroyed, and the regions most affected by the smaller ones smeared with kerosene emulsion, watery solution of Jeyes's fluid or a 2 per cent solution of the latter with linseed or other oil. The latter combination appeared to be the most permanent and effective in results. The horses were infested worse than the cattle, and four head required the application over the entire body.

To improve the pasturage, several acres of grass were burned off in February—not without considerable trepidation, however, as, there being no rainfall at the time, it was feared that, the grass being so dry and combustion so complete, it would not recover quickly enough to be of service. In ten days, however, it had grown sufficiently to accommodate the cattle. They grazed thereon with evident relish, and immediately began to improve in appearance. It was also found that, when the ticks were destroyed on the animals before they were turned to graze on the burned areas, daily reinfestation became less and less, owing to the improved condition of the animals and the freedom of the burned areas from the parasites.

Burning the grass during the dry season serves a threefold purpose, as it furnishes abundant forage of fair quality for cattle, obviates the expense of supplying hay, and frees the land from ticks. Grasses on areas burned during the dry season are of a more palatable and nutritious nature than those obtainable during the rainy season. Several attempts have been made to burn the grass during the wet season, but the resulting new growth is not be to compared with that secured by the same method in the dry season.

The quality of the hay cut last year demonstrates the absolute impracticability of such operations on the farm under present conditions, as the stock refuse to eat it, and its tough, woody nature renders it unfit for ruminants, not to mention solipedes.

WATER SUPPLY.

Owing to the curtailment of the supply of water during March and April, 500 feet of roadway were cleared, to permit the animals to reach the water upstream. This supply eventually failing, a dam 5 feet high was constructed across the stream at a point higher up, where there was sufficient water, but the declivity and rocky nature of the banks prevented access. This dam was built of cemented stone and backed up by timber caisson filled with loose rock. The conveying pipes were bamboo poles, 20 feet in length, the joints wrapped with tarred jute. This primitive affair served the purpose admirably, discharging over 1,000 gallons of water daily at a point 100 yards from the barn, further conduction being impossible owing to lack of pressure.

The dam has so far withstood the violence of the large amount of water flowing over it during heavy rains. A portion of the bamboo piping was carried away by the first freshet, but this was of no importance, as it will all have to be renewed next season if it shall then be necessary to obtain water from the same source and in the same manner.

BREEDING.

At the present time there are 1 Indian and 49 Chinese heifers on the farm, ranging in age from 1½ to 2½ years. Considerable difficulty and delay were occasioned at the outset by efforts to select and breed certain heifers to the desired male, in order that a record could be kept and more definite results be obtained in breeding. It was necessary, however, to abandon the plan, as the bulls were both young and rough and the heifers timid, and the latter, when confined in the stock, struggled so violently that the service in every case was unsatisfactory.

Later, when a heifer exhibited signs of œstrum she was placed in an inclosure with the desired male; but when thus separated from the herd the female was in every instance so anxious to mingle with the other animals that service was impossible. The bulls, too, were developing pernicious habits, so that finally it was decided to allow them their liberty during the day and to confine them at night. This plan has been productive of better results, and many of the heifers are now undoubtedly pregnant. As close a watch as possible is kept over them, and it is thought that about 30 are in that condition.

The Indian heifer, however, isolates herself more or less from the other, and has so far refused both bulls. Several attempts were made to confine her in the stocks for service, but all efforts were unsuccessful. It is particularly desired to mate this animal with the Jersey bull, as the resulting cross would undoubtedly (if a female) be a desirable dairy animal; but so far it has been utterly impossible to overcome her evidently inherent ideas of caste.

Still greater difficulties have been encountered and less success attained in the matter of horse breeding. There are five brood mares on the farm at the present time, and the following record will illustrate the conditions.

No.	Name.	Age.	Nativity.	Times served.	Date last served.	Present condition.
1	Spotted Girl	7	Native	15	July 4	Service too recent to admit of prognosis.
2	Vixen	10	do	4	Dec. 14	Not pregnant.
3	Black Beauty	6	Australian	12	June 10	Service too recent to admit of prognosis.
4	Madge	7	do	1	Dec. 21	Pregnant.
5	Miss Ryan	9	American	9	July 22	Service too recent to admit of prognosis.
6	Greybird	15	do	1	Dec. 21	Died July 12, 1904: not pregnant.

No. 2 has not exhibited signs of œstrum since I assumed charge, although under constant observation. Careful physical examination, however, fails to indicate pregnancy. As this mare and No. 1 have both had colts by another sire, it would point to the unreliability of the one in use on the farm; still, the fact that No. 4 is pregnant (of which there is no doubt) shows that he is not altogether impotent.

Nos. 3 and 5 have been "opened" and artificially impregnated, as is the custom on all large stock farms in the United States, but the last service is too recent to admit of prognosis.

No. 6, a virgin blind mare, died of pneumonia on July 12; had refused the stallion ever since my connection with the farm. Post-mortem revealed, in addition to lung lesions, extensive chronic alterations of the ovaries, precluding possibility of pregnancy under any condition.

No contagious or infectious diseases have made their appearance on the farm other than the introduction of hemorrhagic septicemia previously mentioned, which fortunately spread no further than the herd in question, owing to prompt and rigid isolation.

Two native foals shipped to the farm during the year both died; one previous to my arrival on the farm, from unknown causes, and the other two days after, from impaction of the colon and enteritis.

Considerable labor is entailed at times in caring for the minor injuries the animals receive in playing, fighting, and in traversing the rocky pastures and waterways.

In addition to the work already mentioned and the routine of caring for the stock, the following has been accomplished: Repair of pantalan; repair of roadway to house, three-fourths mile; repair and painting of four barges and rowboat; repair of fences and construction of new ones, inclosing night pasture for bulls and paddock for stallion, and erection of shelter sheds in same; repairs to dwelling and stables, and alterations in latter.

A fish trap was also constructed in the hope of securing sufficient fish for the native laborers, but the results scarcely warranted the expense.

NATIVE LABOR.

Owing to the establishment of the leper colony on the island and the consequent migration of a majority of the population to other islands, securing native laborers has been rendered very difficult and uncertain. The natives still on the island are more or less nomadic in their habits, their wants being few and easily supplied, so that there exists but little incentive to labor.

It has been and will continue to be necessary to subsist them while employed on the farm. Indeed, that seems to be the chief inducement to work, rather than the wages paid. The mortality among them must be appalling, judging from the frequent leaves of absence demanded to participate in the last rites of departed relatives. At other times they must return to their homes to attend to various domestic pursuits, building houses, planting rice, and procuring food for their families.

During the six months preceding my assuming charge the average number of laborers employed on the farm per month was 12. From February to July, inclusive, the average has been 5. From May 18 to July 5, no natives were employed on the farm, it having been necessary to discharge those employed on the preceding date, awaiting the arrival of rice for their subsistence. The rice reached the farm on June 4, but as they were engaged in agricultural operations in various parts of the island, they would not return until July 4, which day, being a legal holiday, meant to them no work but plenty to eat.

EXPERIMENTAL WORK.

An experimental plot has been inclosed, and sorghum, corn, and oats planted in the hope of securing a suitable grain ration for the horses. Irrigation being impossible on the farm, this work must be done during the present season. During July of the present year the unsuitability of the range grasses on the farm for horses was fully demonstrated. Owing to delay

in transit, the supply of oats became exhausted, and for ten days the mares were compelled to subsist upon the native grasses. All, including the native animals, became much reduced in flesh as a result.

A test fence has been built to demonstrate by actual test the durability of native timbers. In all permanent fencing around paddocks and around the house, posts of palomaria, canalipat, or bintung are being used, stripped and painted to a foot above the ground with coal tar and the rest of the exposed surface painted with the inexpensive wash used by the United States Government for light-houses, etc. The additional cost of stripping and painting amounts to but 12 per cent more than setting posts without preparation. In the former case the longevity of the posts will equal that of the wire, while in the latter method continual repairs are rendered necessary after a period of six or seven months, not to mention the annoyance caused by stock breaking through.

To determine the relative cost of building on the farm, two small shelter sheds were erected in the paddocks—one for the bulls, the other for the stallion. Both sheds are 10 by 10 feet, with four corner posts. One roofed with nipa (which grows in profusion on the farm) cost, for labor and preparation of material, ₱14. The other, roofed with galvanized iron. cost for labor ₱3; material, 10 sheets galvanized iron, ₱16; total, ₱19. Considering the cost and durability of the two buildings, it is evident that the advantage lies in the direction of the more permanent materials.

Another example will serve to illustrate the cost of native building material on the farm. Some suali being required for the repair of floors, two native laborers were detailed to make the same. They worked faithfully, but after completing one square yard at a cost of ₱1 the work was stopped, it being the impression that both nipa and suali could be purchased much cheaper elsewhere.

The experience of the past year seems to demonstrate that it is both practicable and advisable to raise more cattle on the farm, though how well the weanlings and purer breeds of cattle will thrive must be decided by actual test.

Unless suitable forage can be grown on the farm for horses, their raising should not be engaged in on an extensive scale, especially with the class of brood mares now found on the farm.

It appears to me that some smaller animals should also be kept ,such as sheep, goats, hogs, and chickens, to demonstrate the advantages of selection in breeding and the beneficent effects of care in feeding and housing during the rainy season, and the importance of humane methods of castration, etc. In this way the value of the farm would be increased from an educational point of view, and animals not desired for breeding could be slaughtered for the subsistence of native laborers.

Indeed, education along the line of animal husbandry is one of the crying needs of the average native agriculturist, and a need that, from its humane and economic importance, demands consideration. He has been denied the facilities for acquiring the knowledge so freely disseminated in the United States by the Bureau of Animal Industry and the agricultural colleges and press. The principles of selection and breeding, the comparative nutritive value of the various feed stuffs, the care and feeding of animals and modern methods of sanitation in the prevention and eradication of contagious and infectious diseases are to the majority of native farmers complex problems, and I know of no more efficient method of demonstrating these subjects than by means of a stock farm, properly stocked and intelligently conducted.

While the possibilities of stock raising in the islands are somewhat limited, the fact that the not inconsiderable meat supply of the capital is derived almost entirely from foreign sources, should be an incentive to strenuous endeavor to supply this demand with native stock.

In conclusion, I am compelled to express regret that this report can not be made to include a description of the calves and foals expected shortly.

That Cleopatra is pregnant as the result of service from the imported Jersey bull, Golden Rod, is quite evident, the little one being due to arrive on September 25. As it will be the first animal born on the farm, its advent will be the occasion of much rejoicing on the part all the employees.

I beg also to refer to the irregularity and uncertainty characterizing the vists of the coast guard vessels to this port. The officials, however, have been uniformly kind and courteous, and have rendered every assistance in the difficulties attending the discharge of cargo for the farm.

Respectfully submitted.

HARRY H. DELL,
Expert in Animal Industry, Acting Manager,
Government Stock Farm.

Prof. W. C. WELBORN,
Chief Bureau of Agriculture, Manila.

EXHIBIT B.

MANILA, *September 10, 1904.*

SIR: I have the honor to submit herewith my report on the distribution of seeds during the year ended August 31, 1904.

SEED DISTRIBUTION.

To facilitate the general distribution of seeds imported by the bureau of agriculture from America, advertisements are inserted in the newspapers of Manila announcing to the public that a supply has been received.

Requests for seeds come from nearly all of the provinces, by letter and telegram, and all are promptly attended to. These requests are recorded by a card system, showing name and address of applicant, date of his request, date of reply thereto, date of sending seeds, kinds of seeds sent, acknowledgment of receipt of seeds, and reports as to results of planting.

Every allotment of seeds sent out is accompanied by a blank form, issued by this bureau, requesting information as to results, namely: Date of sowing, nature of soil, date of harvest, amount produced, and quality of crop; also as to the periods of the dry or rainy season when plantings were made, and whether conditions were or were not favorable for sprouting of the seeds, as well as whether fertilizers were used, and whether plants were attacked by insects or diseases. An official, franked envelope and a copy of Circular No. 1, giving general rules as to how to make a vegetable garden, are also sent with the seeds.

Seeds imported from America are packed in barrels, and arrive in good condition. After having been exposed to the air, they are placed in tin-lined wooden cases, or in galvanized iron cans. Bisulphide of carbon and naphtha are used to preserve the seeds and kill the insects that are bound to attack them if proper precautions are not taken, especially in this country, where seeds so easily lose their germinating power.

The smaller seeds are kept in sealed glass tubes and bottles, to protect them against moisture. They are exported to foreign countries in tin tubes, powdered charcoal, a well-known preservative against moisture, being mixed with them.

There have been sent to America and to some of the botanical gardens native palms, such as *Arenga sacharifera* (Cauon), and *Corypha umbraculifera* (Balon luyon); also seeds of the *Cananga odorata* (Ilang-ilang), a plant which should be much more widely cultivated than at present, as its flower (from which is extracted the essence of the same name, so highly esteemed in the European perfumery trade) commands a good price in the market.

There are two pronounced seasons in the Philippines, namely: The rainy season, commencing in May and ending in October, and the dry season, from November to April. Seeds are therefore ordered twice a year from America, to arrive in April and October.

Seeds to the amount of ₱7,278.22 were purchased during the period July 1, 1903, to June 30, 1904.

Trial lots of seeds have been distributed among provincial governors, military and constabulary outposts, superintendents of schools, civilian and military employees, a large number of farmers and, in fact, all who have requested them. However, some of the packages have never reached the addressees, owing, no doubt, to poor postal facilities in some parts of the islands.

Distribution has been made of eucalpytus, alligator pear, papaw, and *Jatropha curcas* seeds; also seeds of *Dioscorea demona*, *D. alata*, *D. fasiculata*, *Pachyrizus angulatus*, and *Colocasia esculenta*.

Seeds have been sent to the following provinces:

Abra.
Albay.
Ambos Camarines.
Antique.
Babuyanes.
Bataan.
Batanes.
Batangas.
Benguet.
Bohol.
Bontoc.
Bulacan.
Cagayan.
Capiz.
Catanduanes.
Cavite.
Cebu.
Concepcion.
Culion.
Guimaras.
Isabela.
Isabela de Basilan.
Iloilo.
Ilocos Norte.
Ilocos Sur.
Jolo.
Laguna.
Lepanto.
Leyte.
Manila.
Marinduque.
Masbate.
Mindanao.
Mindoro.
Negros Occidental.
Negros Oriental.
Neuva Ecija.
Neuva Vizcaya.
Pampanga.
Pangasinan.
Paragua.
Rizal.
Romblon.
Samar.
Sorsogon.
Tarlac.
Tayabas.
Union.
Zambales

Before this land was cleared and prepared for cultivation I found it necessary to remove the ant hills and brush from same. The wood cut from the farm has been saved and will be used for fuel for the steam thrasher. The total amount is something over 10,000 rahas, and with this I expect to furnish all the fuel necessary.

The 400 or 500 acres of land which I had previously planted in rice of the Japanese variety proved that the seed was of a high germinating power, as an excellent stand was obtained from the entire field. This rice did very well until it was about a month old, at which time it had only reached an average height of from 3 to 4 inches. At this time it seemed that the crop was affected by climatic conditions or soil temperature unnatural to this special variety. When rice is at this age it should begin to stool and thicken the stand, but ours did not, and seemed incapable of combating the obnoxious grasses. Under such conditions we found it impossible to keep our land clean. It became badly contaminated with a foul obnoxious growth, which was much larger than that of the rice. The rice grew no higher than 9 to 12 inches, making a very light, short head, with from 9 to 12 grains. The yield would not exceed over 3 cavans per acre, of a very light and chaffy nature. We were unable to save this crop, as it continued to rain and shower almost every day, thus keeping the grain in a wet, uncurable condition. It was impossible for us to operate our harvesting machine on account of the undergrowth and the short height of the rice; consequently it was necessary that the rice be cleared from the land in order to get the best results with a future crop. This work had to be accomplished in the native manner, that is, cut with bolos like knives.

The natives planted 10 or 12 acres of the Anita variety adjoining our field on the east and south. No difference can be noticed in the soil, and planting was done at the same time that we planted the Japanese rice. They gave their crop no care or attention and it was badily neglected on account of insufficient water. Anita rice generally makes a very prolific growth, reaching a height of from 2 to 3 feet and yielding heads with from 50 to 80 grains of well-formed rice. At time of harvest, owing to continuous rains and the manner in which the native was obliged to harvest his crop, I was unable to ascertain the exact yield per acre, same being estimated at 12 cavans of 100 pounds each.

In connection with harvesting the above-mentioned Japanese rice crop, we kept the plows (numbering 5 gangs and 2 Oliver disks) at work replowing the land and preparing it for the present crop, which is being planted with seed of the Dinalaga variety. The first of this crop was planted from June 14 to 18. For this work we used the disk harrow with seeder attachment. The amount of seed used on the land for the first 100 acres was 6 pecks, or about 60 pounds. This seemed to be too much seed to obtain best results, and on the second 100 acres we changed our machine so as to plant 40 pounds per acre, which equals about 1 bushel of seed. On all this land we were successful in getting an excellent stand. The rice is now two months old, has an average height of 14 inches, is perfectly free from all foul and obnoxious growth, has a fine, healthy color, and has stooled from 3 to 11 shoots.

This particular stock has greatly interested the native planters and is daily being visited by them, and they say it is the best piece of rice land they have ever seen. The rice is all flooded, and from now on the expense will be about 4 to 6 laborers daily to change the water when it begins to become stagnant.

During the month of July last we experienced the heaviest rain of any season during the past six years, but, even under these circumstances, to the surprise of the natives, we were able to continue work every day. We have lost no time on account of mud and rain, and our plows and other machinery were used quite as successfully under the above-mentioned conditions as they could be on drier land.

In addition to our horses, we worked 8 head of oxen in connection with gang plows of the 12-inch size. Four cattle will successfully operate one of the above-mentioned plows, giving a daily average of 2½ acres. During all of this work we experienced an unusually small number of sore shoulders and collar galls. This speaks fairly well for the excellent care given our stock by the native teamsters. I also wish to state that I have not seen one case of scratches, thrush, or any other hoof disease. For the past six months we have used exclusively, with best results, native grass and rice planted for hay. With this roughness I have been able to keep our horses in a fine working condition and, in general, showing the best of health. The oxen have been fed exclusively on native grass, and grain to the extent of two quarts of oats each per day. They are all in excellent condition and there has been no sickness whatever, excepting the one steer that died of pneumonia, reported to your office under date of August 12, 1904.

During June and July I put out quite extensively a piece of Dinalaga variety of rice, planting same at intervals in beds for the purpose of furnishing plants for carrying out an experiment in transplanting rice, the custom usually practiced by the natives. In this experiment we are meeting with best results, successfully planting the land at a cost not to exceed $1 gold per acre. We are fully reducing the expense of planting as we become more familiar with this kind of work. The paddies where this rice is transplanted have to be prepared in a very wet and muddy condition. This work is performed most successfully

with American draft horses and mules, with spring-tooth harrows. No other machinery that I have ever seen works so satisfactorily as the harrow, although it can not be used to any great extent with other than heavy draft horses. The Australian mares are too spirited for this kind of work. In making an estimate of the transplanted rice to date I should say that we have out about 160 acres.

We have experienced no difficulty in securing all the help we wanted. The wages are at present 31 centavos each per day. We at first paid 26 centavos, but the natives were not able to work more than six or seven hours per day. This we found very unsatisfactory, and in order to obtain the required results and necessary help we increased their wages 5 centavos per day each. This enabled us to increase the number of hours from six to seven hours to nine hours and also to accomplish about one-fourth more work per day.

By this transplanting system we will be able to continue planting as late as October 15, by which time we are in hopes, or rather expect to have a standing crop of not less than 1,000 acres, which will give a yield of not less than 10,000 cavans, or 20,000 bushels. It is to be understood that for future planting we will not necessarily require the same amount of labor as at present. It is necessary now to employ a large crew for changing and rebuilding the rice dikes (which are to be of a permanent nature when constructed), for working modern machinery, and for cleaning the land of brush, ant hills, and grasses. When we get the land cleared we will be able to cultivate with much less expense and should obtain much better results. The average amount of plowing should be greatly increased with the same number of animals, and the machines be capable of performing more work with less friction.

The number of animals assigned to this station is as follows: Seventeen head of mules; 10 head of Australian draft horses; 8 head of Australian mares; 15 head of native mares; 7 head of native colts; 1 Australian colt, increased at station; 1 American standard-bred stallion; 1 Kentucky-bred jack; 8 head of steers.

The following animals died, as previously reported to your office: One colt died of internal hemorrhage, rupture of a blood vessel; 1 native pony of lockjaw; 3 native colts died of complications following distemper; 1 China steer of pneumonia.

All stock at this station is in excellent working condition. In addition to the abovementioned stock, we have one Berkshire boar.

In closing this report I feel it my official duty to mention again the good services rendered by the native laborers at this station, especially the teamsters, who have taken excellent care of the stock.

Respectfully submitted.

C. E. MILES,
Acting Superintendent Government Rice Farm.

Prof. W. C. WELBORN,
Chief Bureau of Agriculture, Manila.

EXHIBIT D.

MANILA, *March 26, 1904.*

SIR: I have the honor to submit the following report relative to the thrashing of palay at the government rice farm, Murcia, Tarlac, and in other parts of Tarlac Province.

From January 12 to March 12, 1904, there were thrashed 17,778 cavans of palay, 1,918 cavans being received as toll to defray expenses of operating the machine. These expenses include skilled and native laborer, board of the latter, fuel, oil, etc., amounting to $1,400 United States currency. At present prices the toll collected will pay all expenses and leave a surplus of $500 for wear of machinery.

The class of work performed by the thrasher was such that the native farmers quickly saw the advantage gained by thrashing with a modern machine over their old method of thrashing with horses and carabaos. Hundreds came from other provinces to see the work we were doing and went away convinced of the merits of the machine. Many reports were circulated claiming there was a devil in the machine and that palay thrashed with the machine would not grow. Others said that we had a depósito and would take 16 cavans during the day and at night we would haul it away. We convinced them by fair dealing that these stories were false.

The native farmer is very quick to see anything when it benefits him. Two farmers bought a thrasher and have contracted for another to be delivered for the next thrashing season. One is to be used in Tarlac Province and the other in Pampanga Province. Many expressed their intention of increasing their acreage next season.

The native laborers employed upon the thrasher were very efficient, working ten hours per day and doing work which was much heavier than any that they were accustomed to do. The thrasher covered about 125 miles in all, from starting to finishing point, although

the place where it finally finished thrashing was only about 25 miles from the place where the work began. In the majority of cases we made our own roads, crossing creeks, ditches, rice fields, and hills, and even making our way through the bosque with the machine. The thrasher was taken over almost impassable roads with very little trouble, showing that it is practicable to take the machine over almost any part of the country.

There was a very fair crop of palay in this section, as the farmers do not depend entirely upon the rainfall, but in the event of drought bring water through ditches from the rivers. The best palay came from fields which had been irrigated. In many places Japanese rice was planted in December, January, and February, and is now looking well. This makes two crops per year from the same field. The land is fast coming under cultivation again.

On account of death of work animals many inquiries were made concerning steam plowing. Many farmers spoke of forming societies to raise sufficient funds to purchase steam plows. The engine could be used both for running the thrashing machine and for the sugar mill. But they first wish to see a steam plow in successful operation. In this section of the country fuel will cost about $1 per day for an engine. By using a steam plow the acreage can be increased very rapidly, and it is perfectly feasible to operate a steam plow on this soil.

I respectfully recommend the purchase of a steam plow, consisting of a 35 horsepower engine and one 6 or 7 gang plow and harrows, the cost of which will be in the neighborhood of $4,500 United States currency, and that same be sent to the government rice farm, where this machine will prove a very valuable addition to the machinery already there, and where its usefulness can be demonstrated to the farmers of Tarlac and other provinces.

I think this matter should be taken up at once and a machine ordered, so that this work can be taken up in November of the present year.

Very respectfully,

ZALMON K. MILLER,
Machinery Expert, in Charge of Thrashing.

EXHIBIT E.

SAN RAMON, ZAMBOANGA, *August 5, 1904.*

SIR: In compliance with your request in communication dated July 16, I have the honor to submit the following report of San Ramon farm for the year ending July 31, 1904:

San Ramon is in a much better condition than it has ever been since the American occupation. While the returns are not as great as last year, they are not discouraging to those who understand the situation. We have had abundance of rain, so that the main crops (cocoanuts and abaca) are in a very healthy condition. The greatest drawback has been the difficulty of transportation and the need of stock with which to break up and prepare the land for planting. The Chinese carabaos that were sent from the insular purchasing agent are wholly unsatisfactory, as we have been unable to accomplish anything with them. Of the 40 received but 7 are alive. Of the 8 old carabaos, purchased prior to the Chinese carabaos, but 3 are alive, making a total of 10, and 4 of these are not able to work.

COCOANUTS.

In some places cocoanut trees have not fully recovered from the drought of 1902. This is especially true of those planted inland and on sandy soil, or in soil deposits from the mountains. Where the land is clay from a depth of 3 to 5 feet, with sand underneath, they have regained their former vigor and are now producing their full quota of nuts. A vigorous tree maintains from 26 to 32 leaves. In nine cases out of ten, when less than this amount, the racemes break (the nuts being heavier in a premature state than when fully ripe) and fall to the ground, breaking apart and making a retreat for the rhinoceros beetle, which feeds on the undeveloped fruit. Disturbing the leaves or fiber of trees in any way, after they have reached the bearing stage, is injurious to the tree, as the leaves will drop and leave racemes unsupported. Under no consideration should green leaves be removed, as nature has provided that when fiber and leaf have served their purpose the latter will drop and the fiber can then be removed with the cutting of the fruit.

The cocoanut tree in this locality has very few enemies. Five trees have died as a result of the rhinoceros beetle attacking the leaves at the base. If trees are cut or punctured in any way between the ages of 3 and 5 years, or before the wood is hard, they will invariably be attacked by the aforesaid beetle. After this period notching the tree in order to ascend does not seem to injure the tree in the least. Crows as well as monkeys are injurious to young fruit, but to no alarming extent. Between the ages of 3 and 5 years the growth of the trees can be aided by splitting the fiber (with a sharp knife or bolo) that is wound tightly around the tree. This will aid nature to the extent that the time from planting to bearing will be lessened one year. It pays to cultivate young trees and to fertilize those in bearing.

In preparing nuts for planting the best results have been obtained in the following manner: The nuts are selected from trees known to be good bearers, bearing not less than 150 nuts per year, these uniform in size, brown in husk, rich in copra, and fully ripe. Fully 98 per cent thus selected will germinate successfully. After cutting they should be placed immediately in the nursery provided (of course in the shade) on the ground—not hung on poles, as natives are said to do. Prior to placing in seed beds a bit of the husk should be chipped off of one side; it should then be laid, outside up, and left to germinate. Nine months usually elapse before they are ready for planting. The nut, when placed on end, as is sometimes done, sends out a spindling plumule easily broken at the point of protuberances, and, at best, never gains the vigor of those germinated according to the method given. Two thousand nine hundred and thirty-one trees have been planted this year, most of them on ground that has been plowed and pulverized and put in the same condition as for a corn crop. The result has been a marvelous growth, the trees being more than twice as large as those left to themselves. Total number of trees on the farm, 13,631.

ABACÁ.

Of the 12,769 abacá plants planted this year, 9,316 have been planted on land especially prepared—that is, plowed 12 inches deep, thoroughly pulverized, and put in the best possible condition, and, since planting, whenever the weather would permit, the cultivator was passed, and the result has been beyond my expectations. There is no abacá in this vicinity of two years standing that will equal this of one year. Three thousand four hundred and fifty-three plants were placed in new ground during the months of May and June. This ground was not broken up, but simply cleared of trees and brush. The result is yet to be seen. The soil being much richer, however, than that which has been planted to sugar cane, it is reasonable to suppose that it will compare favorably with the cultivated land. Ten stalks were selected from that planted two years ago. It was stripped separately and produced fiber 12 feet long, weighing 12½ pounds, or 1¼ pounds to the stalk. No crop has been found that could be recommended to plant between rows. Corn, camotes, etc., have been tried at planting, and to this day the row that started out unimpeded by any growth can easily be determined. Abacá differs from cocoanuts in the respect that it does not impoverish the ground to the same extent, as all refuse is left on the ground. A small portion that is attached to the fiber is returned to the ground after separating. If properly planted and cared for, abacá is a valuable crop, the best results being obtained by planting 9 feet each way and in straight rows, so as to admit of cultivation.

CACAO.

In the old orchard, where trees were planted by Spaniards, there are a few surviving trees, and these are in a healthy condition, producing 6 piculs of cacao. The returns, however, do not compare favorably with either abacá or cocoanuts; 483 new plants were set out this year.

ALFALFA.

About one-half acre of land was duly prepared for alfalfa, the same methods being adopted as those used in California. The seed germinated very readily and grew to a height of 8 or 10 inches and then died. There was no insect visible, either at the root or on the stalk. The one-half acre selected was on low land, 200 feet from the ocean.

VEGETABLES.

The report on vegetables is unsatisfactory, to say the least. Tomatoes were planted in what seemed a "garden spot" and, when nearly ready to ripen, were killed in an hour by the sunshine that follows rain. They were planted near bananas and had considerable shade; but not enough as it proved. No other tomato seed has been received that would germinate. Corn, beans, and eggplant are the standbys on the farm. Radishes, onions, and lettuce are, of course, easily grown. Beets, turnips, carrots, etc , have so far proved indifferent crops.

RAINFALL.

The rainfall from September 13 to June 30 was as follows:

	Inches.		Inches.
September	4 1/8	February	16 3/8
October	5 1/8	March	9 3/8
November	8 3/8	April	3 1/8
December	10 3/8	May	3 3/8
January	1 3/8	June	1 1/8

Making a total of 63 inches for nine and one-half months.

Total operating expenses ₱10,657.55 Philippine currency. This does not include the cost of carabaos received from the bureau of agriculture. Total receipts from sale of products ₱6,124.44, leaving a deficit of ₱4,533.11, Philippine currency.

Respectfully submitted.

GEORGE M. HAVICE,
Superintendent San Ramon Government Farm.

Prof. W. C. WELBORN,
Chief, Bureau of Agriculture, Manila.

EXHIBIT F.

AGRICULTURAL COLLEGE AND EXPERIMENT STATION,
La Carlota, Negros Occidental, June 23, 1904.

SIR: I have the honor to submit herewith a report upon agricultural conditions and capabilities in Negros Occidental.

HISTORICAL.

La Granja (the grange) at La Carlota consists of 775 hectares of fertile land which slopes gently upward from the coast plain to the foothills of Mount Canlaon, the streams from which, properly utilized, would be ample for irrigating the entire farm, besides turning turbines for dynamos and sugar mills.

At the beginning of the insurrection, the buildings were burned by the ladrones, leaving only two warehouses and the sugar mill; and when the civil government took over the property there were but five carabaos left with which to break up the land that had accumulated a four years' growth of weeds, brush, pacul, wild bananas, and cogon grass.

At present there are 20 carabaos, 7 mules, and 2 horses in use. One hundred and eighty-nine acres have been put under cultivation, principally in sugar cane.

SUGAR MILL NEEDED.

The whole coast plain west of La Granja, except a narrow strip along the sea, is the richest hacienda region in the island, being planted almost exclusively to sugar. It was the policy of the Spanish Government, during the last ten years that this station was under their control, to make it an object lesson for its neighbors in advanced methods of sugar production.

The sugar machinery installed here was the best obtainable, and experiments with different kinds of cane and different methods of planting and fertilizing were constantly in progress. The mill is still good but entirely out of date and inadequate.

Five hundred of the 750 hectares of this station might be planted in sugar cane, to furnish revenue in whole or in part for the maintenance of the agricultural college about to be established here.

At present about 45 per cent of the juice is wasted, and hundreds of laborers on a hacienda are frequently employed to sun-dry the bagasso (waste) that should be ready to burn on leaving the rollers and passing over the furnace; such things as vacuum pans and centrifugal are unknown.

PROSPECTS FOR SELF-SUPPORT.

Sugar and hemp are the two crops which will do best in our soil and location; we have planted 140 acres of sugar and 40 acres of hemp, and would recommend that these acreages be largely increased in the future. The hemp, excepting 20 acres not included in the above, will not yield a revenue for two years; but next year's sugar crop should be 5,000 piculs.

HOW SUGAR CANE IS RAISED.

The methods of producing sugar cane in this section are far in advance of its system of milling and, except in one particular—fertilizing—leave little room for improvement.

When a new tract of land is to be planted, if the timber is already removed (as is generally the case) the land will be found to be grown up to cogon, wild bananas, and pampas grass to the height of 4 to 10 feet, respectively. At a favorable opportunity this can be burned off, and the new growth that springs up in a week should be pastured by cattle or carabaos. Repeated cutting of the stalks of wild bananas and cropping by cattle must result in their final eradication from the land.

If burned in April and the fields pastured until the following December, the cogon will be pretty thoroughly killed, and its place taken by other grasses of shorter length, which are more readily eradicated by plowing. If the cogon is not destroyed before plowing, repeated plowing will be necessary to eradicate the roots.

Mowing the grass before plowing has been found less effective than plowing and harrowing, since by the latter method the harrow removed a much greater quantity of roots. The method employed is the following:

Sometime between January and May (the earlier the better) the land is given one plowing with American 6 to 10 inch plows, followed by a harrowing or two; then, after two weeks of rest, another plowing, at least 8 inches, is given with an American plow, to reach below the roots of the cogon.

A rest of from two to three weeks is given after the first plowing, for the purpose of allowing the grass which has been turned over by the plow to rot and die: after this, cross plowing and harrowing will put the land in condition for planting, and planting must follow immediately.

My experience with many of our American plows is that they do not scour in this soil, and do not turn the soil under properly. This, however, may be because the proper model has not yet been selected by the importers.

PLANTING CANE.

After the land is prepared, furrows are marked off about 4½ feet apart, the work being done by American 6-inch plows, by an experienced workman who does the work accurately by the eye alone. Then double furrows are run with plows and the rattoons (the parts of the stalk that are cut off after the top is removed) are planted by hand.

Rattoons are first soaked in water for two or three days; then the leaves are removed to expose the buds, thus causing the young sprouts to appear above the ground about one week after planting, several weeks earlier than would be the case otherwise.

The rattoons are about 12 inches long, and are planted 12 to 20 inches apart in the rows, lying on an incline of about 30°, with the last buds appearing above the dirt that the planter has filled in around them.

Fields are planted from January until May, so that they may ripen in rotation and thus furnish a continuous supply for the mill.

At La Granja it will not be necessary to plant new rattoons for the next five to eight years, I am informed by my neighboring hacendados. The soil here is very rich.

CULTIVATION.

As soon as the cane is 10 inches high the plow is run through twice between each two rows, throwing the dirt away from the cane; then a very careful hoeing is given.

When the cane has reached a height of 3 feet it should be plowed again, the dirt being thrown toward the rows so that the water during the rainy season will not injure the cane. This is generally the final plowing.

After another hoeing and weeding no further cultivation is necessary unless the weeds should get started again before the rainy season; for, during the rainy season the ground is too wet and the cane too large to admit of cultivation. During this season of the year especial attention should be given to keeping the drainage ditches open along the lower side of the cane fields.

A great saving of labor could be effected by the use of a plow taking two furrows within 8 inches of the cane and throwing the furrows in the middle so as to give the hoe hand a chance to get in between the cane to destroy all weeds. This will also loosen up the ground around the plant, so as to give the roots a chance to penetrate in to the soil.

After the cane is, say, 3 feet high, it could be run through with a double moldboard plow. This would throw the dirt toward the cane and give it the proper amount of soil, and also make an irrigation ditch in the center, which, in case of heavy rains, could also carry off the surplus water.

IRRIGATION.

If water is applied during the dry season it results beneficially; but at other times irrigation weakens the saccharinity of the cane and its total value is too small to warrant more than a small outlay for the purpose.

HARVEST.

When the cane yellows the lower leaves turn dry, the stalks become brittle, and the flowers (if there are any) fall, the cane is considered ripe, and it is cut off close to the ground with bolos. The tops are cut off at the same time and thrown in rows for fodder, the leaves stripped off, and the cane hauled to the mill in carts or on tramways. If mills were

built at the lower edge of the farms, a system of gravity incline tramways, reaching out into the fields like the extended fingers on a hand, would enable the hacendados to transport the cane to the mill without using work animals except for the return of the car.

As harvesting and planting are both carried on at the same time in sugar raising, an extra large force of work animals must be kept throughout the year for this double labor; hence, this would be an advantage, as it would reduce the number required.

WAGES.

All workers on haciendas receive both board and salary. The board usually cost the hacendado 1 peso [a] a week per man. The salary of the capataz [b] is 45 pesos per month, that of the cabo [c] 22 pesos, the mill hands 8 pesos, and the field hands 6 pesos per month.

On La Granja the laborers board themselves, and the wages are somewhat higher than the board and wages paid elsewhere, the field hands' wages being 35 to 50 cents Conant per day, and those of native teamsters from 75 cents to 1 peso Conant per day.

LABOR.

In spite of all that has been said of the Filipinos as inefficient, we must bring in a minority report. Some, it is true, are found to be averse to labor, and their services are quickly dispensed with; some are unfit for any but the commonest manual labor, while there are others who quickly learn to handle horses and to perform the usual farm operations. In short, we observe the same characteristics among laborers here that appear in laborers in the United States, except that a Filipino is unskilled at first, and does not work as many days a month as the laborers in the United States do—this latter probably due to the fact that he has fewer wants.

The laborers on La Granja are not contracted for, as is the custom among the hacendados, the rule among the hacendados being to pay some labor contractor 10 pesos for each native laborer, the contractor securing the laborers on some other island. These men must work through the entire sugar season, and a certain amount of their pay is always withheld in order to keep them at work.

At La Granja we have not yet experienced any trouble in getting all the employees required. Each native on La Granja is given a small plot of ground upon which to raise his camotes, corn, and other necessaries of life. The natives are much better cared for at La Granja, and we have less friction with native help than the hacendados have.

CAPITAL.

The rates paid for money with which to harvest sugar are as follows: A firm in Iloilo advances a credit of about two-thirds of the probable value of the next crop, the money to be drawn as needed. This is usually done in May, and 15 per cent is paid from that date for money that will not be drawn until the following December to May.

The hacendados is required to consign his crop to the firm as security, accept their classification, pay them for the sunning and resacking—although the latter is not necessary—pay 2 per cent per month for storage in the firm's warehouse, ship his sugar in the firm's lorcha, and purchase all his hacienda supplies from the same firm, and pay 25 per cent on the money loaned.

RAILROADS.

A railroad through the hacendados region, from Cabanoalan to Silay, would need little or no grading, and, if it had its terminal in Escalante or some other deep-sea port, where ocean-going ships could come in alongside the warehouse where the cars discharge their freight, a great saving could be effected over the present methods, which involves six transfers by coolies between the hacienda and the steamer. The sugar that is carried into Iloilo on lorcha is carried out in another lorcha to the steamer.

FERTILIZING.

Some haciendas have produced cane continuously for fifty years without any return being made to the soil. Lime, which is very cheap here, could be used, and also the ashes obtained from the bagaso. Next year we hope to experiment with ashes of the sugar cane, which, theoretically, should give results because of the potash they contain. Cowpeas, or other nitrogen gatherers, grown with the cane, would be also an interesting experiment.

Several lots of cane imported from Hawaii have been planted. They are growing well, and a report will be made next year.

[a] Equal to 50 cents gold. [b] Farm foreman or overseer. [c] Foreman.

TREES—HOW TO PROTECT VALLEYS FROM WASHING.

On the southern part of La Granja are deep valleys, extending back into the level land, changing it into ridges that grow narrower and narrower with every rainy season. In one of these valleys we propose to plant rows of bamboo at right angles to the valley's trend. Bamboo rejoices in such a location, and its roots, by their great spread and minute ramifications, hold the soil in a firm grasp. It is expected that the trees will strain out the stones and coarse dirt as the streams flow through them, and that dams and trenches will thus be formed.

Cogon, that seeming enemy to farming, has undoubtedly been doing a great service in holding the soil on hillsides from washing away and, consequently, great care should be taken to provide other protection after removing it; otherwise there will soon be left nothing but a field of bowlders. To provide such protection rows of bamboo should be planted across the hillsides.

Hemp, cocoa, coffee, cotton, etc., should be well protected against the wind storms, which are sometimes almost cyclones. For a quick-growing protection nothing we have found equals bamboo, as it grows in about one year. A bamboo hedge is a good substitute for an American barbed-wire fence.

Mango trees, on account of their height and strength, furnish a good protection against storms, but are much slower in growth than bamboo. They require from eight to ten years before bearing. They are raised from the seed and grow in almost any deep soil. From 1,000 to 2,000 fruits per tree, worth about 16 pesos, is a good yield. We intend planting some this year.

Cotton trees.[a]—The cotton tree grows rapidly, is easily planted from cuttings, and gives straight timber, besides its annual yield of a material with which pillows are stuffed. Several hectares will be planted this year.

Agho.—The tree called "agho" in Visayan grows rapidly from cuttings. Ten acres have been set out among the recent plantings of pineapples and hemp, and along the roads.

Dyewood.—Dyewood is now growing upon 2 acres at La Granja, having been planted here during the Spanish occupation.

Lemon.—One-half acre of native lemons have been planted. Good cultivation should be given them and, when grown, the grafting of imported scions might be tried.

Pawpaw.—The pawpaw bears fruit in about one year from the time that it is planted, and bears almost continuously for six years. The ripe fruit has been found remedial in case of stomach trouble. The green pawpaw can be boiled and fried and eaten as a salad, and has the remarkable property of softening the toughest meat if boiled with it, as in soup, etc.

Cocoa.—The cocoa planted during the Spanish reign, that escaped the depredations of white ants and other insects, was destroyed during the insurrection, with the exception of six trees. These have been pruned, and are now bearing to the value of 2 or 3 pesos per tree. About 100 seeds are planted in bamboo sections, and the sections were split and set in the ground when the plants were a month old. These sections prevent the attack of a worm that eats the roots during the first year.

FIBERS.

Cotton.—American cotton has been thoroughly tried during the past year. Plantings have been made from July to April, on both high and low land. Its growth is vigorous. That on the high ground came up well and grew rapidly, but just before maturing that planted on July 25 began to sprout in the boll, and part of the boll dropped off. This, however, was not so serious as the boll weevil, which appeared in December, destroying the young bolls. We shall await with interest the battle in the United States against the pest, for cotton planting on La Granja at the present time is only a waste of time and labor.

Hemp.—The climate and soil here are admirably suited to the production of this staple; and the added fact that it grows best in locations unfit for sugar, such as the steep sides of ravines, makes it a valuable supplementary crop for diversified land like La Granja. During the last year we have set out 25,550 plants, chiefly of the following varieties: Moro, Bisaya, Salawag, Camarines, and Kinisol.

Hemp needs moisture the year round, and while the rainfall at this section is less than among the hills farther up toward the mountains, an examination of the rain report appended will show that the region compares favorably in amount and frequency of rainfall with Albay, the region of greatest hemp production.

Hemp grows better in land with clay subsoil than in black humus. It must have drainage, and if not planted in ravines shade should be provided, and danger from burning cogon averted by planting rice and corn between the rows.

[a] The tree producing a short fiber, called in some countries kapoc; very valuable for stuffing pillows and sofas, but can not be used for spinning.

Hemp may be planted by digging up seedlings, removing stalks a few inches above the ground line and planting the base that remains. If the distance the plants are to be carried is not too great, the stalk need not be cut off at all, except to trim the leaves.

Planting should be done in the early part of the rainy season, and the usual distance is 10 feet apart in the rows; if planted more closely the plant does not grow a trunk of large diameter.

FIBER MACHINERY.

On plantations near here one-half of the crop is paid to the workman as his salary for extracting the fiber. If a machine could be devised to do the work it would make a fortune for the inventor. We would suggest that water power could be used to turn wringer rolls that would draw the hemp over spiked and bristle cylinders, revolving at a high rate of speed in opposite directions.

FORAGE.

Teosinte, etc.—The forage crop that has given the best results on La Granja is teosinte. When planted too sparsely it does not thrive well. The rows should be 4½ feet apart and 1 foot apart in the rows to obtain the best results. Three to four crops can be gathered from one planting, and the fodder is relished by American horses, as well as native stock, above all other kinds of green food.

Millet, when planted in January and April, has given good results, but alfalfa has been a total failure.

COFFEE AND TOBACCO.

Some 150 coffee plants 1 year old were found in the field, where coffee was planted some years ago, and were transplanted to a more favorable location. All are doing well.

Sumatra and Habana varieties of tobacco have not had a fair trial, because of the seed arriving in bad condition. Native tobacco is doing well here. Two crops can be gathered per year.

CORN.

American corn has done well here, except that the ear of the Golden Dent variety is too long for the husk, and this is easily attacked by ants. We grind the corn, oats, and palay for the horses and mules in the following proportions with chopped teosinte: 100 pounds oats; 130 pounds palay, horse ration; 250 pounds corn.

Four quarts are fed at a meal, and the teosinte is fed in place of hay, with the result that no horses have had indigestion since this method was adopted, and that there has been a saving in the amount of oats used.

Three or four crops of corn can be raised on the same piece of ground; the fourth crop, planted generally in June or July, is very difficult to mature, owing to the rainy season, although it could be used for fodder, and keeps new land from a rank growth of weeds, etc.

BROOM CORN.

One-fourth of an acre was planted in February. The result was astonishing. I obtained from one stalk ¾ to 1 pound of seed. Some was fed to mules and horses with excellent results, and relished when given with ground feed, such as corn and palay. Should this corn take the place of oats, three to four crops could be obtained per year. It could also be used in place of rice, as it has the same nourishing properties, and the natives relish it as well as they do rice, and it is not subject to drought and grasshoppers to the extent that rice is.

IMPROVEMENTS.

This institution has expended in the neighborhood of 6,000 pesos in improving the roads and putting in bridges and culverts. The bridges are built of stone and cement. Irrigation ditches have been run to several fields, and a camarin (shed) 28 by 190 feet constructed for the new lot of horses soon to arrive.

SEED DISTRIBUTION.

Besides the 1,000 pounds of teosinte seed sent to the bureau, we have given away 500 pounds to the hacendados and others. Three piculs of rice have been given away to the Philippine farmers in lots of one ganta each. Fifteen bushels of American corn have likewise been distributed in lots of five ears. Besides these, an abundance of garden seed have been distributed.

GRASSHOPPERS.

The first lot of fungus received here from the government laboratories at Manila was broken, and of the second lot only that in sealed tubes developed. A swarm of grasshoppers, 3 miles wide and 5 miles long, appeared in the latter part of April and caused considerable damage to the sugar cane. We caught about 50 and wet them in the fungus solution. Many dead ones were noticed by different hacendados.

ACREAGE.

Though hindered at first by the lack of work animals, we have succeeded in breaking up nearly 330 acres of waste land, and respectfully report the following acreages:

	Acres.		Acres.
Sugar cane	140	Native lemons	½
Teosinte	30	Vegetables	2½
Hemp	32	Cocoa	1
Pineapples	10	Coffee	1
Corn	20	Dyewood	2

RAINFALL REPORTED AND ITEMIZED REPORT OF PLANTING.

A report of the rainfall at this station, and a table showing the planting of the seeds received from the department and the result obtained therefrom is appended:

Rainfall beginning July 9, (1903).

July	13.65	April	9.12
August	9.85	May	6.95
September	14.64	June (22)	5.83
October	15.79		
November	7.91	Total	113.22
December	17.78	June 23, eight-hour rainfall and still falling	4.59
January	4.87		
February	4.43	Total	117.81
March	2.40		

Respectfully,

JOHN HEIL,
In Charge of Station.
J. HARRY ANTHONY,
Disbursing Officer.

Prof. W. C. WELBORN,
Chief, Bureau of Agriculture, Manila.

EXHIBIT G.

MANILA, *August 27, 1904.*

SIR: I have the honor to present the following report of my work as soil physicist in this bureau from the date of my arrival in the islands, December 15, 1903, to the present time:

As soon as circumstances permitted an examination of the soils and agricultural conditions around Baguio and Benguet was undertaken, and I now beg leave to report as follows:

GENERAL PHYSIOGRAPHY.

The country around Baguio is very mountainous and hilly, traversed by deep canyons. The town is situated in a small valley on the summit of a large mountain, and has an elevation of 5,000 feet above the level of the sea. Its approximate geographical coordinates are latitude 16° 32′ N. and longitude 120° 35′ E. of Greenwich. The valley where Baguio is located comprises an area of some 60 acres and is formed by slightly sloping hills varying in heights from 60 to 100 feet above the general level of the valley and almost surrounding it. On the northeastern side a deep ravine is found. For miles in all directions large hills and mountains, with small valleys and depressions, are found.

The most important of the valleys around Baguio is that of Trinidad, about 3 miles distant from the capital. This is the famous atoll first recognized as such and described by Semper and later further described by Drosche and Abella.

The elevation of La Trinidad is given as 4,500 feet. The atoll is about 1½ miles in diameter, the wall varying in height from 500 to 700 feet, with an inclination of about 30°. A small stream runs across a portion of the valley, emerging through a narrow slit in the wall. During times of high water this slit very often becomes closed or obstructed by large bowlders, checking the stream and flooding the valley with several feet of water.

Situated at an elevation of 2,100 feet, and about 14 miles distant from Baguio, is the Sablon Valley. Around the village of Sablon there are some 100 acres of very good land, most of which has from disuse been re-covered with a thick growth of vegetation. The little valley is traversed by a stream carrying good water, which could be easily applied for irrigation. Several other small valleys are found around Baguio, most of which are more or less under cultivation.

SOILS.

The predominating type of soil of Baguio and vicinity is a red clay or clay loam, underlain by heavier red or yellow phases of the same material. The soil is of residual origin, formed in situ by the long-continued processes of decomposition of the underlying rocks.

The rocks of this district embrace those which are characteristic of the Caraballo Central or Cordillera Central of northern Luzon. According to Abella, these consist of a core of ancient diabasic and diaritic schists together with massive rocks belonging to the same type and epoch, which is cut at some points by very modern trachytes and andesites, and is overlain, to the west at least, by the same limestones, conglomerates, sandstones, and clays which constitute the post-Tertiary formation of the central part of Luzon.

Around Baguio and vicinity the oldest exposed rock is diorite, and it is from the decomposition of this rock that the Baguio soil is principally derived. The aluminous hornblende and the ferruginous constituents played a very important part in the formation, the iron giving the red or yellow colors and the hydrated aluminous silicate (clay) giving the soil several clay-like characteristics.

In several places, as is the case near the governor's residence in Baguio, this soil is mixed with considerable quartz fragments, pieces of the rock from which it is derived, and considerable gravel, but as a general rule this soil is not stony.

In classification this soil belongs to the type recognized by the Bureau of Soils, United States Department of Agriculture, as Cecil clay, samples of which have been analyzed mechanically and chemically by the writer in the laboratories at Washington, D. C. The Cecil clay is found in the United States in Cecil and Harford counties, Md., in the Statesville area, North Carolina, and in other places.

In Baguio considerable difficulty has been encountered by the bureau of agriculture and by private enterprises in growing American vegetables, which in the Trinidad Valley, only 3 miles distant but in different soil, do remarkably well. Some have attributed the difficulty to the colder climate of Baguio as compared with that of Trinidad; others to the lack in the Baguio soil of sufficient available plant food for the proper development of the plant; and still others to the presence in the soil of some substance deleterious to plant growth.

It was with the object of investigating this point that the writer was sent to Baguio in January, 1904. About three weeks were spent in Baguio and vicinity, traveling through the country, collecting samples of soils, and taking notes on the general agricultural conditions of the district. Typical samples of soils were collected and brought to the laboratories in Manila for mechanical and chemical analyses.

MECHANICAL ANALYSIS OF SOILS.

The texture, physical properties, and conditions of a soil have now come to be regarded by soil investigators as controlling factors in crop production. Hilgard has shown (Weather Bureau Bul. No. 4) that the physical properties of the principal soils of the Atlantic coast States have a controlling influence upon crop distribution and production.

In more recent publications the same author has thrown considerable light upon soil fertility by his researches on some of the physical properties of soils.

For the last ten years the Bureau of Soils, United States Department of Agriculture, has been working on the physical properties of soils, and the publications of this Bureau form a very considerable part of the world's literature on soil physics.

Soils adapted to the same class of crops under given climatic conditions have, as a rule, the same texture or the same relative amount of sand, silt, and clay, while the texture and physical conditions of soils adapted to other classes of crops differ greatly from these. In discussing this point I can not do better than quote to a considerable extent from the publications of the Bureau of Soils, United States Department of Agriculture.[a]

[a] Texture of Some Important Soil Formations.

Truck, wheat, and grass crops illustrate in a marked degree the effect of the texture and physical properties of soils on crop distribution and production. The trucking interests of the Atlantic coast States are confined to light sandy soils; wheat is most successfully grown on a heavy loam, while the finest type of grass land is a strong, stiff clay.

The light sandy truck soils are so open and porous that the water readily descends through them after a rain. The heavy limestone soils, on the other hand, are so close in texture and so retentive of moisture that the rainfall passes down through them very slowly and they maintain an abundant and uniform supply of water. The conditions in the truck soils are not favorable to wheat, for, under the dry conditions prevailing in these soils, the plant does not tiller well but throws out one or two stalks, which attain but a small size before the seed head develops and the plant ripens. The conditions in the truck soils are still less favorable for pasture grasses, because these should not mature. The very conditions which render the truck soils unfit for grass and wheat give them, however, their peculiar value for forcing vegetables to an early maturity. The early truck interests of the Atlantic Coast appear to be confined to soils containing not over 10 or 12 per cent of clay in the subsoil. The best wheat lands contain from 20 to 30 per cent of clay and 18 or 20 per cent of moisture. A grass soil should contain enough clay to offer a great resistance to the descent of rain, or the soil grains should be so arranged to offer the necessary resistance. The best grass lands contain 30 or 35 per cent of clay and maintain 20 to 25 per cent of moisture.

METHODS OF MECHANICAL ANALYSES.

The mechanical analyses here reported were made according to Osborne's beaker method, described in the annual reports of the Connecticut Experiment Station for 1886–87, with such modifications as were deemed necessary.

This method requires a great deal of time, and, while it is considered quite accurate for practical purposes, more satisfactory results may be obtained by the use of centrifugal force for the separation of the soil particles.

The bureau of laboratories, where the analyses were made, has on hand a very complete outfit for the mechanical analysis of soils with the aid of centrifugal force, and the apparatus will be set up as soon as the laboratory is moved into its new building.

The following table gives the mechanical analyses of four typical Baguio soils and their respective subsoils, and, for the purpose of showing the similarity in mechanical composition between the Baguio red soil and the Cecil clay of the United States, the mechanical analyses of two samples of the latter soil and subsoil are included.

Mechanical analyses of Baguio red soil and Cecil clay compared.

No.	Locality	Description	Organic matter and combined water.	Fine gravel, 2 to 1 mm. diameter.	Coarse sand, 1 to 0.5 mm. diameter.	Medium sand, 0.5 to 0.25 mm. diameter.	Fine sand, 0.25 to 0.1 mm. diameter.	Very fine sand 0.1 to 0.05 mm. diameter.	Silt, 0.05 to 0.005 mm. diameter.	Clay, 0.0005 to 0.0001 mm. diameter.
5a	Baguio; below sanitarium	Red loam; 0–50 cm	9.24	4.36	7.12	4.21	13.66	10.08	30.15	21.13
5b	Subsoil of 5a	Heavy red loam; 50–100 cm.	5.11	2.33	6.33	2.16	10.11	12.73	34.36	26.81
6a	Baguio; pine growth	Red clay; 0–50 cm	9.12	1.57	4.68	2.86	8.74	4.03	38.86	30.21
6b	Subsoil of 6a	Yellow clay; 50–100 cm	9.16	.54	1.53	.71	7.01	3.38	40.16	37.45
10a	Baguio; Whitmarsh farm	Red clay; 0–50 cm	10.52	3.47	6.16	5.09	5.38	4.18	35.15	30.08
10b	Subsoil of 10a	Very red clay; 50–100 cm.	7.34	1.83	3.09	2.05	3.11	2.22	28.13	52.18
14a	Baguio; near governor's residence.	Red clay loam; 0–50 cm	8.15	1.03	5.38	2.90	8.17	3.07	36.13	35.11
14b	Subsoil of 14a	Red clay; 50–100 cm	8.63	1.70	2.38	2.95	6.13	4.08	30.85	43.22
a6113	2 miles W. of Darlington	Cecil clay; 0–10 inches	9.38	1.72	3.46	2.70	9.10	3.74	39.56	29.86
a6114	Subsoil of 6113	Yellow clay; 10–36 inches.	9.48	1.38	3.82	2.90	8.86	3.49	34.62	34.66
a6115	Near Darlington	Cecil clay; 0–10 inches	7.96	.58	2.00	1.54	4.98	3.90	46.22	32.12
a6116	Subsoil of 6115	Red clay; 10–36 inches	8.00	.88	2.58	1.28	3.44	2.84	28.76	51.67

a Field operations of the Bureau of Soils, U. S. D. A., 1901, p. 218.

As may be seen from the above table, the percentage of clay particles in the upper 50 centimeters of the Baguio soil varies from 21.13 per cent to 35.11 per cent, and in the second 50 centimeters, or subsoil, from 26.81 per cent to 52.18 per cent. The percentage of silt is also higher, as a general rule, in the subsoils. As would naturally be expected in soils of this character, the percentages of coarse sand and fine sand are low. The table shows a

strong similarity in mechanical composition between the Baguio red clay and the Cecil clay of the United States. There are other points of resemblance; for instance, color, and to some extent geological origin; for the Cecil clay, like the Baguio soil, was greatly influenced by the disintegrating products of aluminous and ferruginous hornblende, and lastly, the natural conditions under which the soil is found before cultivation.

The Baguio red soils support a good growth of natural vegetation. A large number of tropical flowering plants and trees, including the pines of the colder regions, grow in this soil without difficulty. Besides, some of the agricultural products of the country do well. Coffee trees grow practically wild, without cultivation or care, and yield well. Camotes, the native sweet potatoes, produce in abundance, and the native Irish potatoes do well.

One very striking peculiarity about the Baguio red soil, and in which it seems to differ from the Cecil clay in the States, is the coagulated condition of its particles, giving the soil a very loose structure, and thus permitting comparatively easy cultivation.

The Baguio soil possesses all the elements of fertility, but probably sufficient quantities of these are not in an available form for the successful cultivation of certain kinds of crops. The use of commercial fertilizers is recommended, also the plowing in of green manures that will improve the condition of the soil.

I will now quote a few paragraphs dealing with Cecil clay from Dorsey's report [a] on the Statesville area, North Carolina, which would apply with equal propriety to the red soils of Baguio.

"The Cecil clay is recognized as the strongest land in this section of the State for general farming purposes. In some of the more hilly regions it is not very productive, for it is apt to be stony and rough, but as a general rule this soil is quite susceptible to improvement and can be made exceedingly productive. Deep plowing greatly benefits this soil, and well-informed farmers say that it will retain fertilizers for a good many years. It needs thorough cultivation before as well as after the crop is planted, and in almost every case the addition of well-rotted stable manure and clover or other green crops produces a wonderful effect in increasing its fertility. While it is a heavy clay soil and requires better implements and more thorough cultivation than some other soils, the increased expenditure in preparing this land is more than balanced by the larger crops that can be produced upon it.

"Corn makes good growth on the Cecil clay, and 50 bushels per acre can be grown by good farming, but the average variety exceeds 15 or 20 per acre. * * * Wheat succeeds well, especially on land that has been deeply plowed and thoroughly pulverized before the seed is drilled. * * * The average yield of oats is about 20 bushels per acre. * * * Cecil clay is good clover and grass land, but trouble is often experienced in getting a stand in unfavorable seasons."

The soils of the valleys and lowlands around Baguio are formed from both residual and sedimentary sources. In the Trinidad Valley the surface 3 or 4 feet of the soil is formed of washings from the hillsides and of sediments brought in by the river during times of flood, while below this depth the residual red or yellow clays of the district are found. The general character of the soils of the valley is a dark loam, light in texture, underlaid by a heavier loam, and this in turn by clay.

Similar in general physiographic and geological features to the valley of Trinidad is the Sablon Valley. The soils, like those of Trinidad, are of sedimentary origin, a rich dark loam being the predominating type.

The following table gives the mechanical analyses of a number of soils and subsoils from the Trinidad Valley:

Mechanical analyses of Trinidad Valley soils and subsoils.

No.	Locality.	Description.	Organic matter and combined water.	Fine gravel, 2 to 1 mm. diameter.	Coarse sand, 1 to 0.5 mm. diameter.	Medium sand, 0.5 to 0.25 mm diameter.	Fine sand, 0.25 to 0.1 mm. diameter.	Very fine sand, 0.1 to 0.05 mm. diameter.	Silt, 0.05 to 0.005 mm. diameter.	Clay, 0.005 to 0.0001 mm. diameter.
1a	Trinidad; Exp. station	Loam; 0–50 cm	11.50	2.71	2.92	3.07	8.59	19.83	31 18	20.12
1b	Subsoil of 1a	Clay loam; 50–100 cm	4.98	.89	7.23	4.48	6.09	15.87	20.10	40.31
2a	Antonio Rubira's farm	Loam; 0–50 cm	10.15	1.23	7.46	11.22	10.14	30.22	15.36	14.08
2b	Subsoil of 2a	Clay loam; 50–100 cm	11.55	.75	1.90	2.64	3.08	17.38	26.41	37.25
3a	Trinidad; Exp. station	Loam; 0–50 cm	8.73	.67	3.60	3.54	16.37	28.36	20.16	18.53
3b	Subsoil of 3a	Clay loam; 50–100 cm	9.05	.50	2.80	3.37	7.18	10.48	20.37	45.21
4a	Trinidad; rice land	Dark loam; 0–50 cm	11.63	1.03	3.04	4.58	14.32	16.83	28.16	20.35
4b	Subsoil of 4a	Clay loam; 50–100 cm	12.11	1.02	2.90	4.06	10.56	16.33	20.82	32.16

[a] Field Operations of the Bureau of Soils, U. S. D. A., 1901.

It is seen from the above table that the surface soils of Trinidad contain less clay and silt particles than the corresponding soils of Baguio and, in turn, have larger proportions of very fine sand and fine sand.

CHEMICAL ANALYSES.

Through cooperation with the bureau of government laboratories, the chemical analyses by acid digestion were made by chemists of that bureau.

The following table shows the results of chemical analyses of a number of Trinidad Valley soils, as found by Messrs. Walker and Salinger, of the bureau of government laboratories:

Chemical analyses of Trinidad Valley soils.

No	Locality.	Description.	Loss on ignition.	Nitrogen (N).	Phosphoric acid (P_2O_5).	Potash (K_2O).	Lime (CaO).
31	Experiment station farm.	Loam; good crops; 0–50 cm.	12.83	0.13	0.10	1.71	1.00
32	Antonio Rubira's farm...	Fertilized with manure; vegetables; 0–50 cm.	13.45	.16	.12	1.50	1.08
33	Uncultivated land.....	Grass growth; loam0–50cm.	12.93	.08	.12	.13	.48
34	Rice land.....	Loam, black; 0–50 cm.....	12.20	.06	.13	.13	.59
35	Experiment station.....	Good vegetables; loam 0–50 cm.	13.49	.136	.16	.11	.18
36	do.....	Good vegetables; loam; 0–50 cm.	17.73	.149	.20	.05	.31

Sample No. 31 of the table is a dark loam, growing very good vegetables and in good state of cultivation. It is high in potash and lime, but only fair in nitrogen and phosphoric acid.

Soil No. 32 is a loam from the farm of Antonio Rubira, a grower of Trinidad, who has had good success with vegetables. The soil at the time the sample was taken was planted to pease and had been fertilized with stable manure before planting. The sample is high in potash and lime and fair in nitrogen and phosphoric acid.

Soils Nos. 33, 34, 35, and 36 are only in a fair state of fertility.

A number of typical Baguio red soils were analyzed by Mr. Salinger, of the bureau of government laboratories, with the following results:

Chemical analyses of Baguio soils.

No.	Locality.	Description.	Loss on ignition.	Nitrogen (N).	Phosphoric acid (P_2O_5).	Potash (K_2O).	Lime (CaO)
5	Baguio; pine growth.....	Red loam; 0–50 cm.....	10.50	0.028	0.05	0.05	0.09
6	One-half mile east of Baguio; pine growth.	do.....	11.05	.056	.06	.04	.09
7	Camote field, Baguio.....	do.....	12.29	.069	.09	.10	.18
10	Grass growth, Baguio....	do.....	14.64	.186	.14	.07	.15
11	Coffee land, Baguio.....	do.....	11.52	.075	.12	.04	.15
14	Irish potato land, near Baguio.	do.....	18.74	.155	.12	.46	.18

The results, when compared with those obtained from soils of the Trinidad Valley, may seem rather low; but it should be stated that, even without the knowledge of the natural conditions under which the soils are found, the figures in the table are not sufficiently low to suggest infertile soils; besides, the crops grown and the good growth of natural vegetation found everywhere in this soil prove conclusively that the Baguio red clay is not without its degree of fertility. The great object to be kept in mind is the improvement of the physical and chemical conditions of the soil by careful cultivation and the use of manures and fertilizers.

WATER-SOLUBLE CONTENTS OF SOILS.

Considerable interest has been aroused during the past year among soil investigators on account of the revival by the Bureau of Soils, United States Department of Agriculture, of the old line of investigations considered by many chemists in the past, whether or not the water extract of a soil would represent the food material of the plant.

The greatest obstacle to investigators in the past had been that, with the chemical methods then available, the small amount of plant food contained in a soil extract could not be determined with sufficient accuracy to justify the formation of any definite conclusions.

The bureau of soils has again investigated this old idea of examining the water extract, and has developed very sensitive and rapid methods for the estimating of minute quantities of mineral matter in solution.

Over forty samples of soils from Baguio, Trinidad and Sablon valleys were analyzed according to the methods put forth by the Bureau of Soils, United States Department of Agriculture, in Bulletin No. 22 of that Bureau.

The following table gives a few of the more typical analyses:

Water-soluble contents of Baguio, Trinidad, and Sablon soils.

No.	Locality.	Description.	Depth of sample (centimeter).	Per cent moisture air-dried soil.	Parts per million of oven-dried soil.			
					Nitric acid (HNO_3).	Phosphoric acid (H_3PO_4).	Potassium (K).	Calcium (Ca.)
1	Trinidad experiment station farm.	Loam; vegetables	50	10.0	44.20	56.66	15.07	99.16
2	Trinidad; Antonio Rubira's farm.	do	50	9.5	35.22	51.17	18.13	96.38
4	Trinidad Valley	Loam; rice land	50	11.0	44.45	28.14	13.20	56.28
17	do	Loam; grass growth	50	9.6	30.16	19.80	16.20	29.13
6	Baguio, near sanitarium	Red clay loam; pines	50	11.5	11.56	18.14	14.91	8.49
10	Baguio	Red loam; vegetables failed	50	12.5	9.70	29.28	7.79	4.33
11	do	Red loam; coffee	50	11.0	18.94	22.96	7.25	8.04
13	Near Baguio	Loam; Irish potatoes	50	16.0	10.37	6.30	7.70	23.90
19	Sablon Valley	Loam; uncultivated	50	11.0	35.16	30.24	16.20	70.40
21	Sablon; Fox's place	Loam; good vegetables	50	10.0	40.16	31.16	17.08	40.38
22	Sablon Valley	Earthworm excreta	(a)	7.5	436.12	84.50	77.30	226.78

a Surface.

The table shows the Baguio soils again lower than those of Trinidad. It must be remembered, however, that the Trinidad soils get occasional applications of fertilizing matter in the form of sediments deposited from the river in times of heavy rains and floods and washings from the hills.

Considerable soluble salts (plant food) must be carried in solution in the washings from the hillsides and slopes.

The Sablon soils are very similar to those of Trinidad, and contain about the same amounts of water-soluble constituents. In several places in the Sablon Valley considerable quantities of earthworm excreta are found on the surface of the soil. The beneficial influence which earthworms exert upon a soil is well known. Sample number 22 of the table of water-soluble material shows this influence very clearly.

For the purpose of comparing the water-soluble contents of the Baguio soils with those of Cecil clay, as found in the Statesville area, North Carolina, and reported in Bulletin No. 22, Bureau of Soils, United States Department of Agriculture, the following table is given here:

Water-soluble constituents of Cecil clay.

Date.	Area.	Crop and condition.	Depth of sample.	Per cent of moisture.	Parts per million of oven-dried soil.			
					Phosphoric acid (H_3PO_4).	Nitric acid (HNO_3).	Calcium (Ca.).	Potassium (K).
			Ins.					
Mar. 17	Statesville, N. C.	Rye, good stand; plowed deep; no fertilizer.	0-12	17.9	4.86	5.03		6.37
			12-24	25.3	5.22	5.67		7.17
Mar. 17	do	Rye, heavier than above; old field just cleared.	12	23.8	8.96	5.12		7.04
			12-24	29.5	6.70	12.08		6.70
Mar. 23	do	Corn, good land, but poorly treated.	12	23.4	8.96	4.36		28.16
			12-24	33.9	38.66	4.36		28.12
Mar. 23	do	Wheat, very good, 20 to 25 bushels.	12	20.5	8.08	5.60		5.35
			12-24	34.2	11.98	24.12		7.89
			24-36	31.5	13.78	3.44		7.44
Apr. 6	do	Wheat, 15 to 20 bushels; been improved.	12	25.8	7.19	4.97		28.25
			12-24	31.2	6.87	3.30		20.20

By comparing the figures given in this table with those of the Baguio soils, it may be seen that the latter soils contain at least as much water-soluble nitrogen, phosphoric acid, and potash (the three most important elements in agriculture) as the Cecil clay, and this produces good crops and is considered a good soil. In several cases the substances determined are higher in the Baguio soil than in the Cecil clay soils.

If, with proper cultivation and care, good crops can be grown in the Cecil clay soils of the United States, there is every reason to believe, considering the many points of similarity between the two soils, that as much can be done in the soils of Baguio.

CROPS GROWN AND METHODS OF CULTIVATION IN USE.

Coffee is perhaps the most important product of the country. It grows practically wild with no cultivation or care, does remarkably well in the red soils of the mountains and even where there are considerable stones and gravel.

Most of the coffee plantations of Benguet Province were destroyed during the war and the people are now just beginning to take up again the cultivation of this important product. Numerous small fields of coffee are found scattered throughout the country, almost every native having a few trees around his house.

In the village of Cabayan, about 25 miles north of Baguio, several good sized coffee plantations are found. Harvesting is done in the months of December and January. The coffee is of very good quality and is sold in Baguio by the natives at from 12 to 16 pesos Mexican per cavan (60 pounds).

Probably no more profitable agricultural industry can be found in Benguet for the introduction of capital than the intelligent cultivation of coffee plantations. The climatic and soil conditions are well adapted for coffee, as is proved by the state of thriftiness of the trees under the most careless abandonment. With more care in the cultivation and pruning of the trees there is no doubt that the yields can be considerably increased.

The coffee shrub is deep rooted and therefore requires a deep soil. Deep and thorough cultivation should be practiced in order to favor the retention of moisture and to obtain a greater advantage from the rainfall.

The trees must be carefully pruned to insure the penetration of light and the free circulation of air, as well as to preserve only such portions of the wood as will bear the most fruit and of the best quality.

The coffee industry in Benguet should be encouraged in every way possible because, if properly conducted, it will play an important part in the agricultural development of the country.

Camote.—The camote or native sweet potato which, next to rice, is the principal food of the natives, is grown here to a considerable extent. Several varieties are grown, all of which do well in all soils with but little care.

The native seems to understand very well the cultivation of this, to him, very important crop. The field, as a general rule, is kept free from weeds and at intervals the ground is stirred to a depth of 2 or 3 inches, which is probably deep enough for this plant. The cultivation is done with a bolo or a piece of iron with a flattened end, and principally by women, who also attend to the gathering and selling of the product.

It was noticed that the natives generally select the slopes and hillsides, usually with eastern or southern exposure, for camote fields, in preference to the valleys and hilltops. The writer could not ascertain from the natives their idea for such a preference, but it is the opinion of some of the older white residents that the hillsides are preferred because the soil is believed to be rich and easier to cultivate according to their methods, and on account of protection afforded from strong winds.

Potato.—Another product of the country of considerable importance is the native Irish potato. It is grown in all soils—preferably on the hillsides, as in the case of the camote—and the method of cultivation is very similar to that of the latter product. As a general rule the potatoes are smaller than those grown in America, but the writer has seen a number of native potatoes that would compare very favorably with the American grown.

The native potatoes have an excellent flavor and are decidedly more appetizing than most of the imported Irish potatoes of the Manila market. They are sold in baskets containing about 25 pounds, at from 50 cents to 1 peso Mexican per basket.

This is another industry that should be encouraged. The soil and climate are favorable and, with the better facilities for transportation that will be afforded in the near future, growers will be enabled to ship their surplus potatoes from Baguio to Manila and sell them at profitable prices.

Rice.—Considerable rice is grown, but its cultivation is of course restricted to the valleys and lowlands, where water for irrigation may be obtained. Its cultivation is that usually practiced in these islands. The native plow is in use; also an iron bar 3 or 4 feet in length, with a flattened end and sharp edge, is used for breaking up the ground, The latter method is quite tedious, but a greater depth of soil is reached and the method is believed by the natives to be more beneficial than plowing.

Several tea plants were seen in Baguio, doing apparently well.

There is reason to believe that wheat, oats, and barley could be grown in Baguio. In fact, oats have been successfully grown on the experiment farm, and old residents of Trinidad claim that years ago wheat was grown in the valley.

INVESTIGATIONS IN THE CAGAYAN VALLEY, LUZON.

The months of April and May were spent traveling in the Cagayan Valley. A field outfit, consisting of a box with the apparatus and chemicals necessary for the analysis of the water extract of soils was taken into the field, and about 100 such analyses of Cagayan Valley soils were made. A number of samples representing typical areas of soils from different places in the valley were collected and brought to Manila for further investigations.

In the country between Aparri and Nagsiping corn and rice are the principal products. From Nagsiping west extends the valley of the Chico River, where considerable tobacco of good quality is grown. For over 100 miles from Nagsiping south, along the river, tobacco is the most important and practically the only crop grown. The best tobacco fields were seen in the province of Isabela, between Ilagan and Echague. Particularly nice fields were observed around Echague, and it is claimed that the best tobacco of the islands is produced in this place.

Very good tobacco is grown in the province of Cagayan, especially around the towns of Amulung, Iguig, Carig, Tuguegarao, and places south; but the tobacco is not considered as good as that grown farther south, in Isabela.

The Tabacalera Company has several stations or haciendas in Isabela Province, where tobacco is grown under the management of skilled superintendents, and where certain experiments are conducted. The most important of these haciendas is that of San Antonio, situated on the Pinacanauan River, some 7 miles from Ilagan. Some 750 hectares of land in this hacienda are at present planted to tobacco.

Growing tobacco under shade.—One hectare of land in San Antonio was devoted this year to an experiment in growing tobacco under shade. The instructions for the construction of shade, given in Farmers' Bulletin No. 5 of this bureau, were followed in all essential particulars, except that bamboo and bejuco were substituted for hard-wood posts and wire.

Owing to delay in the arrival of the cheese cloth, the field was planted too late in the season for a conclusive result to be obtained this year. It was noticed, however, that plants under shade were not attacked by insects, and had broader, finer, and darker colored leaves than the plants outside. The superintendent of the hacienda expressed himself as confident that, by growing tobacco under shade, the quality can be greatly improved. The experiment will be continued next year.

METHODS OF CULTIVATION IN USE.

The first operation in growing tobacco is the preparation of the seed bed. This the native usually has near the house or preferably in some cleared piece of ground in the woods near by. New or virgin land is preferred, so the young plants can have a vigorous growth and be in suitable condition for transplanting.

The transplanting begins about the last of December and is continued until the middle of February. Usually most of the tobacco is planted by the middle of January. This year, however, much of the tobacco planted in December and January was damaged by floods and had to be retransplanted in February. Experience has shown that transplanting later than March 1 does not give satisfactory results.

The preparation of the soil consists in plowing and harrowing the land, in which operations the corresponding native implements are used.

The land being prepared, the native provides himself with a string of the same length as the width of the field. Each end of the string is securely attached to a stick for the purpose of laying out the rows. Sometimes the string itself is divided into spaces of 2 feet by securely tying red ribbons at these intervals. These show where the plants are to go in the rows. After stretching the string across the field the holes are made with a stick bolo about 3 inches deep and 3 inches wide. The holes are watered immediately before the plants are put in. The planting is done in the evening, or very early in the morning, when the rays of the sun are not strong. Once the plants are set no further attention is given to the field for six or seven weeks, when the plants are ready for topping.

Topping.—When the flower buds begin to appear topping is begun. Usually from 15 to 20 leaves are left on each plant.

The time and manner of topping exercise considerable influence upon the character of the leaf produced. As a general rule, the earlier a plant is topped the heavier, richer, and darker colored the leaves become. This may be of benefit to one crop and of detriment to others. For instance, in the production of the finest quality of Sumatra wrapper in Florida low topping was found undesirable, as the leaves would become too large and thick for the market demands. From 24 to 36 leaves are left on each plant. Again, it has been found

in Florida that when the soil is exceedingly rich it is best not to top at all, but to allow the plants to go to bloom. Then the leaves are of desirable size, smooth and thin, whereas if topped the leaves would grow large, would curl, and thicken. As no fertilizer is used on the tobacco soils of the Cagayan Valley it would be best, as a general rule, to top low, and thus concentrate the vitality of the plant in 10 or 12 leaves.

WORMING.

The battle with the worms begins in the seed bed and does not end until the crop is harvested. No poisons are used, but the worms are caught by hand and killed. This is usually done in the morning, or late in the evening.

HARVESTING AND CURING.

As a general rule, the tobacco is primed—that is, the leaves of the plant are removed as they mature. It is customary to make five gatherings at intervals of about a week. The native collects the leaves and places them in large baskets which, when filled, are carried to the drying shed in rough sleds or carts.

If the soil is rich, a second profitable crop is produced from the suckers.

As soon as the original crop is topped, suckers will sprout from each leaf. These, of course, are broken off as soon as they appear; otherwise they would hinder the growth of the leaves. When all the leaves have been primed from the original stalk, except three or four leaves at the top, two suckers are allowed to grow from the bottom of the stalk. When the remaining leaves are removed, the stalk is cut just above where the suckers sprout, and the field is immediately cultivated. It is claimed that, when the season is favorable, very good filler tobacco is produced from the suckers.

In the drying shed the leaves are sorted, usually into five classes, according to size, color, and condition of the leaf. The sorted leaves are put on sticks about 1 meter in length, the classes being kept separate. One hundred tobacco leaves are put on every stick, and these are hung in the drying shed to dry. The drying shed most generally found in this country is made in the shape of the native house with roof, but with uncovered sides. The sticks with the tobacco leaves are hung on supports usually set at the following distances: The first about 5 feet from the ground; the next 2 feet higher, while the succeeding ones usually have a distance between them of from 3 to 4 feet.

It is seldom that the native takes the trouble to cover the sides of his shed and thus protect his tobacco from the intense sunlight, strong winds, and rains. I have seen large quantities of tobacco hung on rafters to dry in the open field, without any covering whatever to protect the leaves from the scorching rays of the sun and from rains and dews.

Again, the practice is very common of hanging the tobacco on poles suspended from the floors of native shacks. More attention should be given to the proper construction of drying sheds, if the best results from the curing are desired.

After the tobacco is dried in the native drying shed, it is taken to the company's curing house, where the first fermentation is done. The tobacco during the first fermentation is still on the sticks used for the hanging. The piles are kept at a temperature between 35° and 40° C. The object of the first fermentation is to give the tobacco a little color for guidance in classification and in further curing.

After the first fermentation is complete the tobacco is divided into five classes, according to the length and quality of the leaves. The prices vary from $14.25 Mexican per fardo (4,000 leaves) for the best, to $1 or less for the worst.

In the second fermentation, which is made with the tobacco in fardos, the classes being kept separate, the temperature is kept at about 55°. The piles are frequently turned over to secure the proper heat and regulate the fermentation. The success of the operation depends principally on the experience and skill of the manipulator, as there are so many vital points that enter into consideration.

YIELDS OF TOBACCO.

The yields vary greatly with the seasons, and also with the character of the soil. An average from several years for 1 acre is 610 pounds. In favorable seasons 3,000 pounds of dry tobacco have been obtained from an acre of land.

SOILS.

The general character of the soils of the Cagayan Valley is a sandy loam, 3 feet or more in depth, easily cultivated, and in good physical condition. Small areas of loam or heavier soil are found in several places, but these are usually very low depressions, where flood waters accumulate easily and stand long, thus allowing the fine particles of clay to settle

on the surface of the land. The soils are of sedimentary origin, being formed principally of deposits from the Cagayan River.

The cultivation of tobacco in the Cagayan Valley is limited to the bottoms or lands subject to floods from high waters of the Cagayan River. Once or twice during the rainy seasons these lowlands are flooded with several feet of water containing in suspension considerable quantities of fine sediments rich in fertilizing matter, which, on standing, are deposited on the surface of the soil.

No artificial fertilizer is used on the tobacco lands, and the soils are entirely dependent on the fertilizing action of the floods to supply the necessary elements of fertility.

PHYSICAL CHARACTERS OF THE SOILS.

It is true of tobacco, perhaps more than of any other crop, that the texture and physical properties of the soil influence the physiology of the plant to such an extent as to determine and control the distribution of the differently widely distinct types of tobacco. The different types of tobacco are grown on a wide range of soils, all the way from coarse, sandy lands to heavy clay, limestone, grass and wheat lands. Soils containing a large proportion of clay tend to produce large, heavy plants, which cure to a dark brown or red. A lighter sandy soil produces a plant having a thinner and more delicate leaf which, by proper treatment, can be cured to a bright red, mahogany, or fine yellow color. For wrappers the light soils are the best, while for fillers the heavier soils are usually preferred.

In the Cagayan Valley the best quality of tobacco is grown in the light sandy loam soils bordering the river. The product is a fine leaf, very suitable for wrapper.

The following table gives the mechanical analyses of a number of tobacco soils from the Cagayan Valley:

Mechanical analyses of Cagayan Valley soils.

Number.	Locality.	Description.	Gravel (2 to 1 mm.).	Coarse sand (1 to 0.5 mm.).	Medium sand (0.5 to 0.25 mm.).	Fine sand (0.25 to 0.1 mm.).	Very fine sand (0.1 to 0.05 mm.).	Silt (0.05 to 0.005 mm.).	Clay (0.005 to 0.0001 mm.).
1	Echague	Good wrappers	0.54	2.52	5.24	20.85	40.36	12.13	2.54
4	Cauayan	Wrapper	2.35	4.68	4.04	22.10	40.08	10.46	3.62
7	Ilagan	do	1.30	2.85	6.84	18.92	44.06	11.22	3.84
9	San Antonio	do	.98	1.54	8.15	20.15	25.44	25.13	4.12
11	Cabagan Nuevo	do	1.45	1.60	6.50	32.18	20.16	11.64	5.07
13	Tuguegarao	Wrapper and filler	2.08	4.13	12.55	21.36	25.34	15.75	9.18

The above table gives the texture of the soils upon which the best classes of tobacco of the islands are grown. Samples of tobacco soils from different parts of Union Province, where an inferior quality of tobacco is grown, have been collected by the writer, but for lack of time have not as yet been subjected to analysis. It is the purpose of the soil physicist to make mechanical analysis of all the principal tobacco soils of the islands and determine, if possible, the relation between the texture of the soil and the character of the leaf produced.

The following table gives the chemical analyses of six Cagayan Valley soils out of 25 samples analyzed by Mr. Solinger, of the bureau of government laboratories:

Chemical analyses of Cagayan Valley soils.

No.	Locality.	Description.	Loss on ignition.	CaO.	P_2O_5.	N.	K_2O.	Na_2O.
			Per ct.					
1	Echague	Good wrapper tobacco.	10.29	2.27	0.163	0.160	0.22	0.64
4	Cauayan	do	9.22	1.62	.189	.085	.22	.42
7	Ilagan	do	4.82	2.05	.172	.062	.17	1.07
9	San Antonio	do	7.00	1.33	.276	.075	.12	.83
11	Cabagan Nuevo	do	7.88	1.93	.146	.101	.32	.96
13	Tuguegarao	Wrapper and filler	9.03	1.84	.263	.108	.24	1.01

The soils are all bottom-land soils and are inundated at least once a year. They may be said to be in a fair state of fertility.

From the chemical analyses of 25 samples of soils—13 samples from the lowlands where tobacco is cultivated, and 12 samples from the uplands where it does not do so well and where the flood waters do not usually reach—no great difference in chemical composition between the soils of the two localities is seen. Analyses of the water extracts, as a general rule, show somewhat higher quantities of soluble nitrogen, phosphoric acid, and potash in the lowland than in the upland soils.

The following table gives a few of the analyses made in the field. The quantities of the substances determined are expressed in parts per million of air-dried soil:

Water-soluble contents of Cagayan Valley soils.

No.	Locality.	Description.	Depth of sample.	Parts per million of air-dried soil.			
				Nitric acid (HNO_3).	Phos. acid (H_3PO_4).	Potassium (K).	Calcium (Ca).
			Cm.				
1	Echague	Lowland; fine tobacco	50	38.45	40.00	20.55	36.00
8	do	Upland; poor tobacco; abandoned.	50	10.50	9.05	5.50	18.60
13	Cauayan	Lowland; good tobacco	50	31.15	25.50	16.00	24.00
18	do	Upland; poor tobacco	50	11.50	16.50	3.90	11.00
28	Ilagan	Lowland; good tobacco	50	15.50	16.50	7.45	16.85
37	do	Upland; abandoned	50	9.25	9.55	4.25	28.40
34	San Antonio	Lowland; good tobacco	50	31.00	32.15	21.00	24.00
63	Cabagan Nuevo	do	50	17.75	18.35	20.75	25.00
65	do	Upland; poor tobacco	50	15.40	8.75	10.16	30.35
70	Tuguegarao	Lowland; good tobacco	50	21.50	22.75	18.75	24.60
79	do	Upland; poor tobacco	50	12.75	18.45	16.20	28.70

That, under the present system in the Cagayan Valley of cultivating to tobacco the lands that are subject to periodic inundations only, a fair quality of tobacco will continue to be grown for years can not be denied. Numerous fields continuously cropped to tobacco for the last ten years may be found in the valley, still giving good yields. Notwithstanding this fact, commercial fertilizers can be used to advantage on all the lands of the Cagayan Valley, and it is believed that their use could be made on paying basis. The quality of the tobacco grown would be greatly improved and the area where the famous Isabela wrappers are grown would be considerably enlarged.

Respectfully submitted.

A. M. SANCHEZ, *Soil Physicist.*

Prof. W. C. WELBORN,
Chief, Bureau of Agriculture, Manila.

EXHIBIT H.

REPORT OF H. T. EDWARDS, FIBER EXPERT.

MANILA, *September 2, 1904.*

SIR: I have the honor to present herewith the following report of the work of the division of fiber investigations of this bureau for the year ending August 31, 1904:

OUTLINE OF WORK.

The operations of this division include the following general lines of work: The development of those branches of fiber production which are already established in these islands, e. g., abacá, maguey, and cotton; the introduction of new and valuable fiber plants; the introduction of fiber-extracting machinery; the collection of statistics and data relative to the fiber industry; the collection and description of fiber plants, fibers, and fiber products; the investigation of the physical and chemical properties of fibers; the investigation of the methods of manufacture and the markets for fiber products; the planting and propagation, for experimental purposes, of fiber-producing plants; the investigation in the provinces of subjects relative to the fiber industry; the preparation of reports and bulletins covering the above investigations.

Fiber Exhibit at the St. Louis Exposition.

On June 2, 1903, I was directed by the chief of this bureau to take charge of and collect material for the fiber exhibit of the bureau of agriculture at the St. Louis Exposition. The first three months of the year covered by the present report—September, October, and November, 1903—were devoted to the completion of this exhibit. All of the more important islands were visited, and the material collected was named, classified, and prepared for shipment. This fiber exhibit, when completed, included the following material:

(1) A series of photographs illustrative of the fiber industry.

(2) A collection of various fiber-producing plants.

(3) A collection of fibers, including bast, woody, structural, and surface fibers. The more important commercial fibers, viz, abacá, maguey, cotton, piña, and the rattans, were represented by a large number of different specimens, showing the various qualities and kinds of fiber produced in the different islands.

(4) A collection of fiber products, including various classes of fine and coarse fabrics, nettings, hammocks, cordage, rope, coarse tie material prepared from the bark of trees, natural textures prepared from tree basts and used as a substitute for cloth, brushes and brooms, hats, mats, screens, baskets, bags, pocket cases, etc.

(5) A collection of tools, implements, and machinery used in the cultivation of fiber plants, in the extraction and handling of fibers, and in the manufacture of the various fiber products.

On December 1, 1903, upon the completion of this fiber exhibit, the regular work of the division was resumed and has since been conducted along the lines previously indicated.

Manila Hemp.

The production of manila hemp (abacá) is the most important industry of the Philippine Islands. The interests of this industry are therefore of the first importance in the work of this division. The past year has been an exceptionally prosperous one for the abacá planters. The high prices of the last few years have continued firm and there has been a good demand for abacá fiber. As a result, the exports for 1903 were 406,890 piculs in excess of the exports for 1902. The value of the abacá exported during the year 1903 was $21,701,575, or 66 per cent in value of the total exports from the islands.

Inferior quality of fiber.

The complaints of importers and manufacturers in the United States relative to the large quantities of inferior manila hemp exported from the Philippines still continue. The unsatisfactory quality of manila hemp is causing an increased use of sisal and other competing fibers. Unless some means be devised to regulate the production of this inferior fiber the ultimate result will be a decreasing demand and lower prices for abaca. The source of the difficulty lies in the imperfect method now used for the extraction of the fiber. As it has been deemed impracticable to prevent by law the use of the serrated stripping knife, and inexpedient to regulate by a system of government inspection the exportation of inferior fiber, the most feasible remedy appears to be the introduction of a fiber-extracting machine. By means of correspondence and press bulletins, this subject has been brought to the attention of both fiber producers and fiber-machine inventors. The result has been an increased demand from the planters for a machine, and a stimulated effort on the part of the inventors to meet this demand. Two new fiber-extracting machines have recently been placed at the disposal of this bureau, and arrangements are now being made for a series of trial tests. Several other machines are in course of construction, and, in view of the general interest shown in this subject, there is a very reasonable prospect that a successful abacá-stripping machine may be introduced during the present year. The general use of such a machine will largely increase the production of fiber, will regulate the serious question of an inferior product, and will be of vast benefit to the industrial interest of the islands.

Abacá waste.

Of only secondary interest and importance to the introduction of an abacá-extracting machine is the question of utilizing the great quantity of waste material that remains after the fiber is stripped or cleaned. With the present method of extraction it is estimated that fully 25 per cent of the entire product goes to the waste pile. Even with an improved machine, the waste would undoubtedly be considerable. The most practicable use for this waste, as far as experiments have been made, is for the manufacture of paper. Its value as a paper stock is indicated by the following statement made by Messrs. Gonzales Sons, paper manufacturers of Barcelona, Spain:

"Observations made in the course of fabrication permit us to affirm roundly that abacá waste, as raw material for the manufacture of paper, is not only utilizable, but surpasses esparto and hemp and, in its treatment for conversion into paper, excels rags and other materials known in the industry."

The introduction of this material into the industrial world has been taken up first by the collection and analyses of samples of the waste; and, second, by correspondence with American, European, and Japanese paper manufacturers with a view of arranging for a series of practical experiments in using the waste for paper manufacture. This bureau is now in receipt of a number of requests for samples of the waste to be used for experimental purposes. If the results of these tests are such as to create a demand for abacá waste in the paper world, and at prices that will permit of its exportation, a product of considerable value will have been added to the list of Philippine exports.

IRRIGATION FOR ABACÁ.

The cultivation of abacá at the present time is confined to those districts where there is a heavy and fairly evenly distributed rainfall and a high degree of atmospheric humidity. As there are large areas in these islands where these conditions do not prevail, which are otherwise suitable for the growing of abacá, an effort is being made to determine the results of using irrigation. On May 1, 1904, a plot of abacá was set out at the Singalong Experiment Station, the seed being secured from the island of Marinduque. Owing to the early rains in May and June these plants obtained a fair start and are now in good condition. The next dry season will furnish the first opportunity for observing the results of irrigating abacá in this locality. Inasmuch as there are large areas of undeveloped hemp land in the central and southern islands, where the rainfall is ordinarily ample, it is not probable that the introduction of any extensive or costly systems of irrigation would be practicable at the present time. If, however, abacá can be successfully grown under irrigation in those districts where there is a long dry season, there are many places having an abundant water supply where the industry might be introduced to advantage. If it is found also that an increased supply of water, even where the rainfall is fairly abundant, produces decidedly beneficial results, there are many plantations in the hemp districts where simple and inexpensive irrigation methods might be used with profit.

SHADE EXPERIMENTS.

The relative advantages and disadvantages of growing abacá under shade, and the density of shade required, are questions concerning which there is much difference of opinion among the hemp growers. During the month of May six plots of abacá, containing in all about 8 acres, were planted at the agricultural college and experiment station at La Carlota, Negros. For this experiment 4,290 plants were used, 2,000 of which were grown on the experiment station grounds, the remainder being secured from the plantation of Señor Juan Araneta. The latter included five of the leading Negros varieties, as follows: Five hundred plants of Moro, 500 plants of Kinisol, 500 plants of Salcag, 500 plants of Luno, and 290 plants of Tancao. Six acres were planted with agoho trees for shade purposes, and two acres were left without shade. The results of the two methods, and the relative value of the different varieties of abacá used in this experiment, are yet to be determined.

CULTIVATION OF ABACÁ.

Abacá, as ordinarily grown in these islands, receives but little cultivation. The system generally followed is to first clear and burn the land, and then to set out the abacá, planting camotes at the same time. The latter cover the ground with a dense mat of vines and prevent, to a considerable extent, the growth of weeds. Where this system is followed the first cost is comparatively small and the results fairly satisfactory. It has been demonstrated during the past year, however, at the San Ramon Government Farm that more thorough methods of cultivation are, in the end, less expensive, and give also quicker and larger returns. The following statement of the superintendent at San Ramon is of interest in relation to this subject:

"In starting a hemp plantation it is first necessary to cut down all growth whatsoever, and let it remain on the ground for at least thirty days, or until thoroughly dry, after which it is burned. The burning process not only clears the ground ready for the plow, but also destroys a large per cent of seeds that have accumulated and which are sure to germinate and make endless work for the planter. Then, if carabaos are used for plowing, a 6-inch plow is preferable, the first plowing to be at least 5 inches deep. The land should then be harrowed once or twice and allowed to rest for thirty days. At the expiration of the thirty days it should be cross-plowed and again harrowed, after which it is ready for planting. If rattoons are plentiful, be careful in selection, planting only the large strong plants in straight rows 9 feet apart each way. The best time for planting is at the beginning of the rainy season. If these instructions are carried out, one native with a carabao can take care of 20 acres, at a cost of $15 per month, whereas if not planted in straight rows the abacá can not be worked with a cultivator, resulting in an increased cost of production and a decreased product."

EXTRACTION OF FIBER.

This most important, and at the present time unsatisfactory, branch of the abacá industry has already been referred to under the subject of "Inferior quality of abacá." The required improvements in extraction methods are to be looked for, rather by the introduction of a fiber-extracting machine than from any perfecting of the hand-stripping process. During the month of June, 1904, a series of experiments in stripping abacá by the latter method were made at the Singalong Experiment Station. These experiments were conducted for the purpose of determining the following: The percentage of dry fiber and of dry waste in the stalk; the fertilizer value of the waste and of the stalk, and the value of the waste as a paper stock. Two different lots of abacá stalks were used. These were obtained from the San Ramon Government Farm and from the town of Paete in Laguna Province. The results of the stripping experiments were as follows:

	San Ramon abacá.	Paete abacá.
Weight of stalk.....pounds..	21	35
Weight of fiber strips.....do....	5½	7¾
Weight of waste (wet).....do....	4	5½
Weight of fiber (wet).....do....	1	1½
Weight of waste (dry).....do....	.39	.44
Weight of fiber (dry).....do....	.36	.5
Percentage of dry fiber in stalk.....per cent..	1.7	1.43
Percentage of dry waste in stalk.....do....	1.85	1.25

The small percentage of dry fiber in the total weight of the stalk emphasizes the desirability of introducing a hemp-extracting machine that may be easily moved from place to place so that, as far as possible, the machine and not the raw material may be transported.

Samples of the abaca stalk entire of the dry fiber and of the dry waste were forwarded to the bureau of government laboratories for analysis. The results of these analyses were as follows:

	Per cent.
No. 1. Abacá stalks:	
Total nitrogen	0.043
Total phosphoric acid	.1087
Potash as K_2O	.239
Lime CaO	.047
No. 2.—Abacá stalks:	
Moisture	87.10
Dry matter	12.90
No. 3.—Abacá fiber:	
Total nitrogen	.225
Total P_2O_5 not determinable	
Potash as K_2O	.713
Lime	.16
No. 4.—Abacá waste:	
Total nitrogen	0.52
Total P_2O_5	.0661
Potash as K_2O	.661
Lime	.228
No. 5.—Abacá waste:	
Moisture	17.88
Dry matter	82.22
Crude fiber in dry matter	42.14
Cellulose in dry matter	38.89

The above figures indicate the comparatively small value of abacá waste as a fertilizer material. If this waste can be used as a paper stock, its removal from the land will not result in the loss of any considerable amount of the valuable elements of plant food. The results of analysis No. 5 are to be forwarded, with samples of waste, to the various paper manufacturers.

USES OF ABACÁ.

The rapidly increasing production of abacá, together with the fact that it is being supplanted to some extent by "sisal" in the manufacture of binder twine, suggests the desirability of developing new uses for the fiber, which shall create a consequent increased demand. While abacá is, primarily, a cordage fiber, its extensive local and limited foreign use as a textile fiber is sufficient reason to justify an attempt at its further introduction in the textile world. With this end in view, samples of different grades of fiber and of various classes of abacá fabrics have been sent to the leading textile schools in the United States with a request for information as to the possible value of the finer grades of abacá as a textile fiber.

GROWTH OF THE ABACÁ INDUSTRY.

While no exact figures are available which show the area planted to abacá during the past year, the largely increased exports are a fair indication that the industry has had a healthy growth. No other branch of agriculture in the islands is attracting equal attention on the part of American planters. A very considerable number of Americans are now developing abacá plantations, particularly in the southern part of Mindanao. The passage of the public land act, together with the favorable prospects of securing a hemp-extracting machine, will undoubtedly result in a much greater development during the present year.

MAGUEY.

After abacá maguey or sisal hemp may well be ranked as the second important fiber-producing plant of the Philippine Islands. The maguey plant is widely distributed throughout the archipelago, and its fiber has long been used for local purposes. It is only within the last few years, however, that this fiber has become of any importance as a commercial product. The industry is, at the present time, confined principally to the provinces of Ilocos Norte, Ilocos Sur, and Union. A most important consideration which recommends the further extension of the industry is the fact that maguey can be grown under conditions unfavorable to almost any other plant of economic value. It is not injured by long periods of dry weather. It can be cultivated with a small amount of labor and with but few animals. It requires but little care and attention and has no insect enemies. All of these facts make it eminently suitable as a Philippine crop.

The first work of this division relative to the maguey industry was the investigation of conditions in the Ilocos provinces during the month of November, 1903. The results of this investigation were published the following month as Farmers' Bulletin No. 10, Maguey in the Philippines. Requests were then sent to a number of United States consuls in Mexico and the West Indies for information concerning the maguey industry in those countries. As the result of this correspondence an interesting and valuable report was received from the United States consul at Mazatlan, Mexico. This report was later published by this bureau as Press Bulletin No. 1, Maguey Cultivation in Mexico. These two bulletins have been distributed throughout the islands, and have been, it is believed, instrumental in bringing about the increased interest which is now being shown in the maguey plant.

CULTIVATION METHODS.

The system of maguey cultivation, or, better, of noncultivation, which is found in the Philippines is in every way undesirable. The Philippine planter first transplants his maguey at a distance of 2½ to 3 feet, so close that when fully grown many of the leaves are injured by the spines of adjoining plants. From the time of planting, grass, weeds, and bushes are allowed to grow, until at the end of three years, when the first leaves are ready for cutting, the maguey field has every appearance of an "abandoned farm." Every effort is being made on the part of this division to bring about an improvement along these two lines: More distance between plants and at least a small amount of cultivation.

EXTRACTION OF FIBER AND FIBER MACHINERY.

All of the maguey fiber now produced in the Philippines is extracted by the process known as "retting." This method of fiber extraction is slow and expensive, and results in the production of a fiber inferior both in color and in strength. The purchase of a fiber-extracting machine by this bureau having been approved, an endeavor was made to select from the several machines which are now successfully operated on the Mexican plantations the one best suited to the conditions which prevail in these islands. As there are no large maguey plantations in the Philippines, and but few wealthy maguey planters, it was deemed that a comparatively inexpensive machine, and one simple in construction, portable, and easily operated, would best meet the requirements of the Philippine planter. A machine of this description, manufactured and extensively used in western Mexico, has now been ordered. This machine requires 6 horsepower, can be operated by 2 men, and cleans 8,000 leaves per day. The introduction of fiber-extracting machinery is a subject concerning which many of the maguey planters have shown great interest. If the above machine operates successfully, its introduction will give a decided stimulus to the maguey industry.

MAGUEY FROM HAWAII.

In the month of June, 1904, a number of maguey plants were received from the agricultural experiment station in Hawaii. These plants have been set out at the Singalong Experiment Station, and their future development will enable a comparison between the Hawaiian and the Philippine varieties. A leaf of the Philippine maguey which was retted at this office, and from which the fiber was extracted by hand, yielded 4.5 per cent of fiber. These figures compare favorably with the yield from both the Mexican and the Hawaiian varieties.

PROSPECTS OF MAGUEY IN THE PHILIPPINES.

The wide distribution of the maguey plant throughout the islands, it having been reported to this bureau from 22 different provinces, will greatly facilitate the future development of the industry. With a more general understanding of the value and the good qualities of this plant, with better methods of cultivation, and with the introduction of fiber-extracting machines, this fiber should become one of our important exports.

Cotton.

The cotton plant is distributed throughout the greater part of the archipelago. More than three hundred years ago a considerable quantity of Ilocos cotton cloth was shipped from Manila to Moluccas. The production of cotton, however, has never become a very important industry. From the provinces of Ilocos Norte and Ilocos Sur a small quantity of cotton is shipped every year to Manila, and it is grown in these and other provinces for local use. During the past year the crop in the Ilocos district was much smaller than usual, owing to severe storms in October and November, which destroyed the greater part of the cotton then planted. In the Cagayan Valley better results were obtained, and from there some very good cotton was exported.

The work of this bureau in developing the cotton industry has included the distribution of seed, field experiments at Batangas, La Carlota, and Singalong, and the publication by the assistant chief of the bureau of Farmers' Bulletin No. 9, Algunas Sugestiones sobre el Cultivo del Algodonero. The results of the field experiments with cotton are given in the following extract from a report published by the chief of the bureau:

"At the Batangas station 700 pounds per acre of cotton in the seed were gathered, of fine quality. This yield was 16⅔ per cent greater than the average for the United States. Cotton and cotton goods constitute one of the largest items of imports to the islands. Cotton ought to be worth here 2 cents gold a pound more than it is worth in New Orleans, as it costs at least that amount to bring it here. It did not require very much more labor than it does in the United States, and considering the price of labor was probably produced more cheaply than there. The 700 pounds of cotton here, if well handled, would be worth about $35 gold at present prices of cotton and seed.

"At Manila and La Carlota the cotton proved an entire failure, owing, it was thought, to insect attacks. An insect resembling the Mexican boll weevil was found in abundance on the plants. These have lately been pronounced by Professor Townsend, who has worked with the boll weevil in Texas, to be a different and probably harmless insect. About October and November are the best times for planting cotton."

Kapok (Trees Cotton).

The cotton tree is found in nearly every province of the Philippine Islands. Its fiber is used locally for stuffing pillows and mattresses and is shipped in small quantities to Manila, principally from Oriental Negros. The good qualities of kapok are such, it being one of the most valuable of the so-called "stuffing and filling" fibers, as to warrant its more general cultivation. The tree is easily grown and the yield of fiber is large.

In January of the present year a press bulletin on this subject was issued entitled "The White Cotton Tree." In this bulletin attention was invited to the importance of the kapok industry in the island of Java and the desirability of its further development in the Philippines. The production of kapok in Java has increased from 300,000 kilos (700,000 pounds) in 1882 to over 4,000,000 kilos (9,000,000 pounds) in 1901. During the first six months of 1902, which was a period of industrial depression in Java, 20,398 bales of kapok were exported, of which the United States received about $50,000 worth.

During the month of January an order was placed by the bureau for an improved kapok-cleaning machine. A superior variety of the cotton tree having been reported from Colombia, South America, the United States consul at Quibdo has been requested to furnish this bureau with seed of this variety. With favorable soil and climatic conditions, and with the present distribution of the cotton tree, it is believed that, by the introduction of fiber-cleaning machines and with the further distribution of seed, this fiber may be produced in sufficient quantities for export.

Coir (Cocoanut Fiber).

In the last annual report of this division attention was invited to the desirability of utilizing the great quantities of cocoanut fiber which are now allowed to go to waste. The cultivation of the cocoanut is one of our principal agricultural industries, copra ranking next to abacá in value as an exported product.

In India, Ceylon, and other cocoanut-producing countries this fiber is an important article of commerce. In the Philippines, other than for unimportant local uses, it is allowed to rot.

The utilization of coir has been the subject of further investigation on the part of this division during the past year. Reports have been received from India and Ceylon, containing information relative to the methods of extraction, uses, value, and markets for coir. Data has also been secured in regard to coir-extracting machinery. This information has been furnished to several interested parties outside of this bureau, but up to the present time no machinery has been imported into the islands. In view of the fact that the annual loss to the islands, from the failure to utilize this valuable fiber, amounts to several hundred thousand dollars, it is recommended that the coir industry be made the subject of a special investigation in the countries where this fiber is most largely produced, with a view to establishing the industry in the Philippine Islands.

Philippine Fiber Plants of Local Importance.

Throughout the Philippine Archipelago we find a great variety of fiber-producing plants. More than 400 of these plants, many of them having an extensive local use, have been reported to this bureau. Some of the samples of fiber that have been submitted for examination are fine, strong, and of good color, comparing favorably with the better known commercial fibers.

Bowstring hemp (*Sanseviera* sp.) is found in different parts of the islands and has, during the past year, been planted to some extent in the island of Negros. The fiber of this plant is fine and strong and is, in some respects, better than sisal. The pineapple plant, producing the celebrated piña fiber, is utilized as a fiber plant principally in the Visayas. Piña is one of the most beautiful of all the vegetable fibers. Its more general use is prevented by the extremely slow and laborious method of extraction.

Nito (*Lygodium scandens*) is highly prized by the Filipinos. It furnishes the material used for for making a fine grade of hats, and is also used for tying purposes.

Malabago (*Hibiscus* sp.) is a bast fiber of great strength which is largely used for lashings and for tying purposes.

Idioc (*Caryota urens*), a coarse, strong, black fiber, is used in different provinces for making cordage.

Rattans are abundant in the mountains and forests in all parts of the islands.

Many of the Philippine rattans are of excellant quality, and they are used for a great variety of purposes. The rattans are, also, an article of trade between the different provinces.

Fiber-Extracting Machinery.

If this country is to compete successfully with other parts of the civilized world in the production of the well-known commercial fibers, the introduction of fiber-extracting machinery will be an absolute necessity. Even abacá, which has the great advantage of being solely a Philippine product, is now beginning to feel the competition of other cordage fibers which are extracted by machinery. The following work has been done by this division during the past year relative to the introduction of such machinery. The requirements of, and the demand for, an abacá-extracting machine have been brought to the attention of inventors, both in these islands and in the United States. Two new machines are now completed and ready for trial tests, while several others are in course of construction. Information concerning maguey-extracting machinery has been distributed, both by correspondence and bulletins. As a result one improved, first-class maguey machine has been imported and is now set up and ready for operation. A maguey-extracting machine has also been ordered by this bureau. Cotton gins have been imported by the bureau, and are now being operated in Manila, Batangas, and Ilocos Norte. An improved kapok-cleaning machine has been ordered. Information relative to coir extracting and cleaning machinery has been secured and published.

Statistics and Information.

By means of correspondence, personal investigation, and circular letters, a very considerable amount of valuable data relative to the fiber industry has been secured. This has included a series of reports on abacá, received from provincial governors; similar reports on the distribution in the Philippines of cotton and the cotton tree, and monthly reports from a leading firm of London fiber brokers. By keeping in touch both with the fiber producers in these islands and the fiber importers and manufacturers in other countries, information of benefit to both is received and distributed.

Collection of Fibers and Fiber Plants.

This division was formerly in possession of a very fair collection of fibers and fiber products. This material has been loaned to the Philippine exposition board, and is now at St. Louis. During the past six months we have received the following material:

The plant and fiber of anabo, baquembaques, tacquimvaca, and singitan from the governor of Ilocos Norte; 15 excellent specimens of abacá fiber from Messrs. Smith, Bell & Co.; 30 specimens of local fiber plants and fibers from Batangas; samples of the different commercial grades of maguey from the governors of Ilocos Norte and Ilocos Sur; samples of the different commercial grades of abacá from the governors of Masbate and Oriental Negros; leaves and plants of sisal from the Hawaii Agricultural Experiment Station; samples of cotton from Batangas, Isabela, Ilocos Norte, and Bataan; anabo fiber from Calayan Island; jusi fiber from Iloilo; and samples of textile fabrics from Ilocos Norte.

Scientific Investigations.

During the month of February, 1904, a reaction scheme was prepared for the identification of the more important Philippine fibers. Eight different fibers were then submitted to

the bureau of government laboratories for microscopical examination and chemical tests. In April an analysis was made of maguey leaves, to determine the feeding value of maguey waste. In June and July analyses were made of abacá stems, fiber, and waste, the results of which have already been stated under the subject of "Extraction of abacá fiber."

Fiber Products.

During the past six months the relative use of abacá and sisal for the manufacture of binder twine has been the subject of a special inquiry. An interesting report on this matter was received from the International Harvester Company, of Chicago. As this report contained valuable information concerning the production of inferior abacá fiber, it was later published in the Manila papers. The use of abacá as a textile fiber is now being investigated. The use of Manila rope as a transmission power was the subject of a report received by this bureau, which was afterwards published in the Manila Daily Bulletin.

Field Experiments.

Field experiments with fiber plants have been conducted during the year as follows: Abacá at the Singalong Experiment Station, La Carlota, and San Ramon; maguey at the Singalong station; cotton at Singalong, Batangas, and La Carlota. The details and results of these experiments have already been stated.

Field Investigations.

Four different field investigations have been made during the year, as follows: Maguey in Ilocos Norte and Ilocos Sur, during the months of October and November; abacá in southern Mindanao, during the months of January and February; abacá in Laguna, in the month of June; maguey and cotton in Ilocos Norte, Ilocos Sur, and Union, in the month of August. The results of these investigations have been covered by reports which have been published by this bureau.

Publications.

The following reports and bulletins relative to the work of fiber investigations have been prepared during the year:

Farmers' Bulletin No. 10, "Maguey in the Philippines;" Farmers' Bulletin No. 12, "Abacá (Manila Hemp)" (in press); Press Bulletin No. 1, "Maguey Cultivation in Mexico;" reports: "The White Cotton Tree;" "Abacá Cultivation in Southern Mindanao;" "Agricultural Conditions in Laguna;" "The Relative Use of Abacá and Sisal for the Manufacture of Binder Twine."

Very respectfully,

H. T. Edwards,
Fiber Expert.

Prof. W. C. Welborn,
Chief Bureau of Agriculture, Manila.

Exhibit 1.

REPORT ON THE COCOANUT INDUSTRY.

March 18, 1904.

Sir: I have the honor to report, as the result of my recent journey through the two largest cocoanut-growing districts in the archipelago, specific answers to the questions laid down in your memorandum of January 22, and add, as a supplement thereto, such observations as seem to me most pertinent to the whole industry.

Question 1.—Price of mature nuts.

Answer.—No market; no sales of nuts in Tayabas Province. A large sale is reported from Laguna Province, for consumption as fresh nuts in the Manila market. These are never bought or sold for copra making. For the former purpose only the select and largest nuts are sold. These f. o. b. lorcha at Santa Cruz fetch 22 to 24 f. p.[a] The supply comes mostly from Santa Cruz, Pagsanhan, Magdalena, and barrios tributary to Santa Cruz. Estimated deliveries are 60,000 nuts per week.

Question 2.—Amount of copra 1,000 nuts will make.

Answer.—The average for Tayabas in average years is nearly 4½ piculs[b] of copra per 1,000. This year, owing to the prolonged and abnormal drought, the estimated average for the province is only 4 piculs. In the poorest section (the country about Pagbilao)

[a] Mexican peso, worth about 45 cents, United States currency.

[b] Equal to 137.9 American pounds.

the yield this year was only a little over 3½ piculs, many mature nuts being no larger than an orange. In the country between Sariaya and Canda (a very large region) the normal average is certainly above 5 piculs. Authentic maxima of 6 piculs are given, and for this unpropitious season the average will be between 4½ and 5 piculs. Canda is at sea level and Sariaya at 630 feet elevation, the former upon the coast and the latter about 7 miles inland. For Laguna Province the average yield of copra is hardly more than half of Tayabas. The maximum nowhere amounts to 3½ piculs per 1,000 nuts; the general average runs a little over 2½, and this season will fall as low as 2 piculs. From this it is self-evident that it is largely to the interest of growers to supply fresh nuts to the Manila market, for which they realize quite double the price they receive for those converted into copra.[a] The discrepancy in yield of copra per 1,000 nuts between the two provinces is readily explained, first, by the exclusion of most of the large, choice nuts from Laguna copra; second, by the much thicker, heavier meat of the Tayabas nut. This condition, I think, is due in part to better soil, but still more largely to a better-distributed rainfall.

Question 3.—Value of copra.

Answer.—In Lucena town 5.25 pfs. delivered to buyer, but not f. o. b. In the interior towns of Pagbilao, Tayabas, and Sariaya 5 p. f., the difference merely representing transportation charges to the seaboard. In Santa Cruz the current price is 5.50 to 6 p. f. per picul. The difference is due, first, to cheaper lake than ocean transportation; second, to slightly better quality of the Santa Cruz product. Perfectly dried copra, on fresh fracture, shows a leaden color, slightly whiter in the sun-dried article. Sun-dried copra is only produced in Laguna Province, and only in March, April, and May. Its price last spring was uniformly 6.50 p. f. per picul, or 1 peso more than the fire-dried. It is never sun-dried in Tayabas, as the climate does not permit.

Question 4.—Number of nuts a man can husk and break in a day.

Answer.—One thousand is an average day's work and includes scooping out the meat. Many women and children are employed at this work and are paid 2 p. f. per 1,000 in Tayabas and 1.50 in Santa Cruz. Some in Santa Cruz earn 1 p. f. per diem. These figures include cooking or sun drying the meats; in other words, the whole process of making copra.

Question 5.—Length of time it takes meat to dry at different seasons.

Answer.—Two to three days to sun dry in Laguna generally. On especial asoleaderos[b] of dark, dry lake sand, never more than two days. In Tayabas, or Laguna, the season makes no appreciable difference in the fire-dried product. Twenty-four hours of continuous firing is required for a charge. During a continuous rainy period one or two hours additional are required.

Question 6.—The various ways of selling nuts, copra, etc., including the share that the tree owner and the laborer each gets.

Answer.—About Sariaya the trees are all held by small proprietors who own 100 to 400 trees. The proprietor and his family do all the work, and he derives all the profits. If he owns more than one man can handle to advantage—that is, more than 400 trees—he hires day laborers on a cash but contract basis of 1 p. f. per 1,000 for harvesting and 2 p. f. per 1,000 for all the other processes incident to copra making. The larger proprietors have many peons, who receive one-third of the crop, the proprietor receiving two-thirds. In the far interior of Tayabas, and also Laguna, the peon hauls down to the coast and generally gets one-half of the product; particularly is this so in Laguna. The peon, furthermore does the selling, and as the proprietor is too lazy, or the effort of going down to the coast is too great, he takes the peon's report of sales and such money as he turns in. The great exporting firms have general agents at Canda, Lucena, Atimonan, Tayabas, Pagsanhan, and Santa Cruz, and occasional smaller buyers out in the barrios. They all buy and pay spot cash on delivery at the nearest town. Further movement is at cost of buyer.

Question 7.—Does the owner generally own land upon which the tree grows?

Answer.—Invariably. It is a curious habit, moreover, to buy or sell trees in small parcels of 1 to 500 trees. The price agreed upon for the trees, however, carries title and possession of all the land covered by them. This practice, in some towns, accounts in part for the considerable number of small proprietors. The extreme range of prices averages from 3 to 5 p. f. per tree.

Questions 8 and 9.—Does he generally borrow from the copra merchant; and if so, upon what terms? Or does the laborer borrow from the proprietor, and on what terms?

Answer.—Loans are made, generally in small accounts, to well-known growers on note of hand without collateral security, at the current rate of 1 per cent per month. The transactions in loans at this time are insignificant. Among proprietors and laborers they

[a] The carefully recorded for average over two and one-half years at San Ramon, Mindanao, is 5 piculs.

[b] The copra is spread upon the ground, or upon mats placed upon the ground, or upon the roofs of houses or sheds, or, in fact, any open space exposed to sun and air. Any spot so utilized is called an "asoleadero."—A. B.

are more frequent, the former encouraging loans repayable in labor, thereby increasing his number of peons and enabling him to extend his plantation. He receives payment of his loan in crop share (generally two-thirds) and the peon has the use of all intercalary crops. This insures care of the grove for seven to eight years without expense to the proprietor. When the proprietor has more land in trees than his peons can handle, he lets (by contract) the gathering of nuts and the copra making. Day labor is seldom resorted to and is both scarce and high. The ruling wage is 50 cents Mexican and a ration of rice, salt, and fish.

Question 10.—To what extent is cocoanut oil an article of commerce, how extracted, and what prices are realized?

Answer.—The oil is largely used in cookery, and, though to a smaller extent than formerly, for illuminating purposes. The figures obtained are conflicting and unreliable. The export figures given from Santa Cruz vary from 10,000 to 50,000 gallons. Until October, 1903, all the oil produced in Laguna was from fresh nuts. More was consumed at home and sent over into Tayabas than was exported to Manila. All that used by small proprietors is boiled and squeezed out by hand presses. The larger, old-time mills use up 1,000 to 1,200 nuts per diem. Since the opening of the steam mill in Santa Cruz no oil is made in the old mills there. Three, however, of the old mills are still in almost daily operation in Pagsanhan. The process in these mills is to hold the half of the fresh nut against a rapidly revolving knife blade, or, more properly, a steel drill head. This is operated by a foot treadle and does rapid and effective work. Timing the operation for ten minutes, I am of the opinion that one man can clean out 100 nuts per hour. The ground meats are then thrown into open kettles and boiled in water and the top oil then skimmed off. This oil is clear, clean, nearly odorless, and of bland, sweet flavor. It is more than two-fifths of the total oil product, is exclusively used in cookery and for hair dressing, and sells at the mills at from 1.15 to 1.20 p. f. per gallon, as against a uniform price of 1 peso per gallon for the residual oils. These latter are made by next collecting the cooked meat from the pans and rolling it under heavy, wooden rollers. Thus crushed it is collected in stout bejuco baskets, the form of a sugar bag, and subjected to pressure in a vise whose jaws are wide, heavy molave planks, closed by means of hard-wood screws, which are given an occasional keying up as the escape of oil returns the pressure. This operation lasts about twenty-four hours. The mills visited had two such vises, each accommodating about six baskets of a capacity of one-half picul of meat each. The next day the baskets are emptied in a large heap on the floor, and the contents in forty-eight hours more have fermented to the point of rank putrefaction. Then once more the now odorous mass is repacked and subjected to further vise pressure, which completes the process. Each of the last pressures gives about 30 per cent of the total oil collected. It is probable, however, that the total oil secured does not exceed 80 per cent of the nuts' contents, but this point may be determined by analysis of the press cake herewith submitted.[a] The residue from the pressings (the cake) is 1½ cavans per 1,000 nuts, and has a quick local market for pig fattening at 3 p. f. per cavan, or a total value of 4.50 p. f. per 1,000 nuts. Four to five operatives do all the work and the press cake pays the operating expenses. One thousand nuts produce 20 gallons of oil of a net mill value of nearly 22 p. f.

Santa Cruz has a first-class modern steam power mill of Dowise make, Hull, England. It has a 25-horsepower engine with a wood or husk burning boiler, with stone crushers and elevators carrying the pulp to the hydraulic presses; thence a steam pump carries the oil directly to the settling tank. Only one grade of oil is produced. This is strictly a copra mill, and not adapted to operate the fresh nuts. It cost, laid down in Manila, 21,700 pfs., and housed and set up in Santa Cruz a total of about 24,000 pfs. During a steady run of sixty days it averaged 25 piculs of copra per diem, but has a test capacity of 30 piculs in ten hours or, reduced to nuts, about 1,000 nuts per hour. The press cake of the hydraulic process is remarkably free of oil (containing probably less than 5 per cent), is slow of sale at 1 pfs. per cavan for hog food, and is largely used as fuel in conjunction with husks. The mill has not been operated since January 1. The managers are trying to raise more money to install green nut-grinding machinery. They claim that the local demand for the fresh nuts is confined to the fancy grades, and that they can buy inferior nuts at about one-half of the present price of copra and at which manufacture would be profitable. An engineer, at 2 pfs., and 5 laborers, at 1 pf. each, operate the entire plant.

Question 11.—What is generally done with the husks?

Answer.—About one-third are consumed in copra drying and as domestic fuel. The remainder go to waste. They were formerly thrown in the rivers, but this is now prohibited by law, and they are burned in situ.

[a] Subsequent analysis showed 10.2 per cent oil by the new (hydraulic) milling process and 27.5 per cent by the old milling process in the press cake, which would indicate that the total oil secured in the nut would be about 90 per cent by the new process and about 60 per cent by the old.

Question 12.—What differences exist in prices paid for different grades of copra, and what makes the difference in quality? Could all be made of first quality if handled carefully?

Answer.—The only distinctions recognized are oven-dried and sun-dried copra. The latter commands an almost unvarying advance of 1 p. f. per picul over the fire dried. The current prices at a port (lake or sea) for the fire dried is 5.25 pfs. per picul; sales in the interior, about 5 pfs. The value of the fire dried is about the same in the two provinces. No sun dried is made in Tayabas. The superior value of the sun dried is based entirely upon greater water evaporation. The application of direct fire heat undoubtedly sears the external cells and prevents the escape of some of the water of evaporation. Fire-dried copra shows the darkest fracture. Sun dried reveals within a uniform dull pearl of light leaden gray color. No means can be suggested for improving or increasing the output of the sun-dried article. All the product of Laguna is now sun dried during the dry season. In Tayabas a few continuous days of sunshine are an uncertain quantity. They have no pronounced season, except close to the Batangas border. There, doubtless owing to insufficient rainfall, but few trees are planted.

ADDITIONAL NOTES.

The copra business to-day in both these provinces is largely in the hands of the Compañía General de Tabacalera. The shipments of that firm from Lucena and Canda during the year 1903 were 305,000 piculs, and in 1902, from Atimonan, 71,000 piculs. Smith Bell & Co., Warner, Barnes & Co., and a Chinese firm were considerable shippers. Their figures one could not obtain, nor their agents; but the agent for Smith Bell & Co., in 1902, assures me that all other buyers handle, from those three ports, less than 70,000 piculs. These same agents are now erecting a modern plant in the town of Tayabas, with a capacity for working up the oil of 1,000 piculs a week, based on a run of fifty hours per week.

They were disinclined to give me the total cost of the plant, but told me that the installation of a 50-horsepower Hercules French turbine, and the dynamo that it serves, will cost in the vicinity of $5,000 gold. They also informed me that, aside from the oil-extracting plant, they had purchased a concentration plant in Marseilles, at a cost of 4,400 francs, that would reduce the oil to the condition of an unrefined grease, and that they expected to avoid the vexing question of obtaining oil-tight packages for export. The outfit also includes a complete des-fibrating plant for the manufacture and grading of coir. Within 200 yards of their present water power runs another stream of equal power and at a cost of no more than that number of dollars they can double their water supply and their power. I fancy thatt he cost of the complete equipment of this plant will not be much less than $20,000 gold. It is expected to be in operation before May 1.

The output of copra for this province was estimated in 1902 at 450,000 piculs. In 1903 a vast number of new trees came into bearing, but the effect of the drought caused a shrinkage estimated at nearly one-third of the crop, so that notwithstanding the new acreage the crop remained about the same. The figures of the present year are estimated at 550,000 piculs, which, if one may judge by the large proportion of trees only 8 or 9 years old, and now in bearing for the first time, seems to be very conservative.

In addition to this it is quite safe to assert that trees five years and under constitute one-third of all the plantations in this region. These, in connection with bearing trees not yet having attained the maximum of yield, will beyond doubt increase the output of this province within three years to three-quarters of a million piculs, or enough to keep in steady operation about 15 mills like that of Messrs. Arnalot Hermanos. West of Sariaya, and between that town and Candelaria, are large tracts of land well adapted to the fruit, and plantations are as yet few and inconsequential in size. Still further west of Candelaria are good lands; but thence one approaches the region of insufficient rainfall.

Plantings are made up to the very summit of the divide (Lucban) which separates the lake basin from the maritime region. At the greatest elevation at which I observed trees (1,430 feet), the yield was not above one-half of what is obtained in the valley. Nevertheless, with the abundance of water power in these mountains, there is no reason to doubt but that much of this mountain land could be advantageously devoted to nut growing were facilities at hand to convert the fruit into ultimate products.

Respectfully submitted.

WM. S. LYON,
In Charge, Division of Plant Industry.

APPENDIX M.

REPORT OF THE DIRECTOR OF THE PHILIPPINE WEATHER BUREAU.

DEPARTMENT OF THE INTERIOR,
PHILIPPINE WEATHER BUREAU,
Manila, August 31, 1904.

INTRODUCTION.

I have the honor to present the report of the weather bureau for the year ending August 31, 1904. The report contains two parts. The first gives a brief account of the ordinary work of the bureau, the routine, as it may be called, of the office and observatory. The importance of this work will be readily admitted by anyone who considers for a moment the useful services it renders the public. And by very reason of these services, many of which, though supererogatory, are rendered gratis in accordance with the spirit of our government, expenses are entailed which are often out of proportion with the financial aid given us by the government. This part of the report has been prepared by the Rev. Saderra Maso, who was made acting director during my absence in the United States from November 20, 1903, to August 2, 1904. All that time I was engaged in the preparation of the exhibit of the weather bureau in the Philippine concession of the Universal Exposition at St. Louis. Our participation in the World's Fair of St. Louis will be briefly described in the second part of this report.

THE METEOROLOGICAL SECTION.

OFFICE WORK AND PUBLICATIONS.

During the year the regular work of taking observations has gone on as usual. This work is arranged as follows: From 6 a. m. to 6 p. m. direct readings are taken from the various instruments along with notes on the state of the weather. This is done every day, holidays not excepted. On holidays, of course, only those employees come who are detailed to take these observations, and they are given another day free in compensation. During the night the meteorological data are recorded by the self-registering apparatus. In fact it may be said with truth that the weather bureau is never closed, for the directors live at the observatory, and are ready for extra work at all hours, while on holidays they are on hand to attend to any call or inquiry, whether personal or by telephone; so that, although certain days are assigned for visiting the observatory, viz,

Tuesdays and Saturdays during the morning office hours, nevertheless visitors are received at all hours, especially officers of ships and the like, if they come to consult about the condition of the weather. Hence it is that for the directors at least the office hours are practically all day. And they are never sure but what they may be called upon at any time to receive passing visitors, who are hurrying through Manila, and who can not wait over for a regular visiting day. Besides the labor of taking and arranging observations, which goes on day after day without interruption, there is the constant coming and going of telegrams and cablegrams from the provinces and from China, Formosa, and Japan; and when the weather is threatening, with signs of a typhoon or severe storm, special notices and warnings are hurriedly dispatched to these points.

The work of preparing and editing our Monthly Bulletin has gone on apace, but the printing of it, for one reason or another, has sometimes met with considerable delay. This bulletin is published in English and Spanish. Its regular contents are, briefly: General notes on the weather, magnetic disturbances, earthquakes, crop service, entomological notes with illustrations, a review of the meteorological observations made in the central observatory and in the principal secondary stations, absolute magnetic observations, and the elements of the direction, duration, and amplitude of the principal microseismic movements registered during the month. Besides, we have compiled and printed Part III of the annual report for 1902, containing the hourly observations made in the observatory, as well as Part V of the same, giving the results or averages of the observations taken in the secondary stations. Part I of the annual report for 1903, in which are shown the hourly observations of Manila, is now in press; the part containing the hourly observations of the secondary stations is about ready.

Among extraordinary publications must be classified the special report of the director, or rather, the English edition, revised and greatly enlarged, of his work, "The Cyclones of the Far East." This very useful work contains an exhaustive treatise on the subject of cyclones. It discusses the elements of cyclones, their origin, along with a study of the various theories advanced, their structure, the movement of the barometer during cyclones, rain and cloud areas during cyclones, their movements, their tracks or paths in the Orient, their frequency and classification. Part II takes up the signs of a coming cyclone; first, the clouds, their forms, altitude, direction of motion, and velocity; secondly, the winds, their direction and change of direction, their velocity; then the indications given by the barometer. And here is introduced a full description and explanation of the author's barocyclonometer, an instrument widely used and highly prized by the mariners of the Orient. In order to familiarize as many as possible with the use of this instrument, the chapters of Part II bearing on it were arranged for separate publication, and an illustratrated pamphlet of about 30 pages with the title, "The Barocyclonometer," by Rev. Jose Algué, S. J., was issued by the bureau of public printing. Another publication, and one of great interest to observers, official or private, is the pamphlet on rain, "La Lluvia," by Rev. B. Ferrer, S. J., assistant director. This was published during the year 1903–4. Furthermore, in order to cooperate in the great work of the Philippine census, the director of the weather bureau, at the

earnest request of General Sanger, prepared a concise but very complete article on the climate of the archipelago. This was printed in Washington as part of the census report, and afterwards published as a separate pamphlet.

IMPROVEMENTS IN THE OFFICE.

During the past year a new wing has been added to our building, with the happy result that now the weather bureau finds itself in splendid, commodious quarters. The wing runs out from the meteorological tower, which formed the corner of the old building, and extends along Calle P. Faura for 140 feet. Adjoining the tower is the office, a large, spacious hall, of ample accommodations for the observers, clerks, etc., and within easy access of the instruments. Back of the general office is the private office of the director, and beyond are the rooms of the assistant directors. The rooms and offices all open into a wide corridor, or rather an open-air gallery, which runs along the back of the wing and overlooks the beautiful gardens of the observatory. The great advantage gained by these improvements is that now, with the members of the observatory staff living within a few steps of the meteorological instruments, a constant watch may be kept over the registers with comparatively little trouble or inconvenience, and this not only during the day, in and out of office hours, but also, if necessary, during the night.

SERVICES RENDERED THE PUBLIC.

Under this heading must be mentioned in the first place the weather reports, ordinary as well as extraordinary, which are sent by cable to the Asiatic coast and Japan. This service is highly appreciated by the respective Governments, who have not failed to express their sincere thanks to the American Government in these islands. As a recent proof of this appreciation, we may refer to the earnest solicitude of the governor of Hongkong in lately petitioning the governor of the Philippines to extend the reports sent from here so as to have them embrace observations taken at some of the secondary stations of Luzon. And here we must call attention to the great kindness and generosity of the English cable companies of the Far East. They transmit to us dispatches from the stations along their lines, and send all our weather reports to those stations free of charge and with admirable promptness. They certainly deserve the grateful thanks of all. In the second place mention must be made of the numerous reports with meteorological data of Manila and other points of the archipelago compiled at the special request of different centers of research, or in response to individuals, as well private persons as officials. To give an idea of the character of these reports, which often enough call for several hours of labor, we may cite for example the Report on Rainfall and Evaporation, expedited at the request of Mr. Fitzgerald, civil engineer, to aid him in his plans for a new system of water mains and sewer drainage for the city of Manila; or again, various data furnished different shipping houses for use in cases of litigation over marine insurance.

Another important service done the public is the repairing of barometers, both aneroid and mercurial. These are adjusted, regulated, and compared with the standard barometers of the observatory,

all free of charge, and if they need cleaning they are cleaned gratis, save when the mechanics are obliged to work overtime on them. If any part of the barometer is broken or missing it is replaced by a new piece and the cost price is charged for the material used. More than 80 barometers were regulated during the past year; of these 20 were thoroughly cleaned, and several were replenished with mercury. In addition to this work done on barometers, several other instruments of precision were given proper adjustment in the workshop of the weather bureau, and it is needless to add that without this assistance these same instruments would have had to be sent to Europe or America for repair, with no little expenditure of time and money in consequence.

ASTRONOMICAL DEPARTMENT.

This section, besides giving the daily official time to the islands, is ever ready to furnish whatever astronomical data may be called for. On the occasion of the annular eclipse of the sun, March 17, the Rev. G. M. Zwack, S. J., prepared a pamphlet presenting all the calculations necessary for observing the eclipse in Manila and the Batanes Islands. This pamphlet was distributed as a supplement with the Monthly Bulletin for August, 1903. A plan was in contemplation to fit up an expedition to the Batanes Islands for the purpose of studying the phenomena of the eclipse, but this was prevented by the fact, mentioned above, that two of the observatory staff were absent in America. The observations made in Manila during the eclipse will be found in the Monthly Bulletin for March, 1904.

The official time is telegraphed to the provinces every day at 11 a. m., and signaled to the city of Manila by the time ball at 12 noon of the one hundred and twentieth meridian east of Greenwich.

One of the most useful services rendered to the public by this section is the gratuitous adjustment of chronometers. During the past year the number compared and corrected was over 70—that is to say, many were kept under observation for several days and returned with certificates of their movement and condition, without our taking into account the chronometers which were simply set with the standard clock of the observatory. Captains and officers fully appreciate this service done them, for they well know what it costs in many ports to secure a certificate of the rate and condition of their chronometers.

SEISMIC SECTION.

The regular work of this section is to arrange and discuss the records of seismic and microseismic disturbances registered in the observatory and in the various stations. In addition to this, it cooperates with several foreign geodynamic observatories in exchanging data for special research. At the present moment we are compiling some data asked for by Prof. M. Pertner, of Vienna, who is engaged in a study of the Salonica earthquake of April 4 last. This section is taking part, too, in the international study of earthquakes inaugurated by the second International Seismological Congress, which was held at Strassburg last year. This congress was attended by representatives of all the civilized nations, and as a result of the meetings it was agreed to take up a systematic study of earthquakes and microseismic movements observed in the principal scientific centers of the globe, and in

pursuance thereof it was further agreed to send all data and investigations to a central committee for final compilation and discussion. Although the Philippine weather bureau was not officially represented at this gathering, still our cooperation was earnestly solicited both by the German consul and more directly by the head of the central station of Strassburg, the president of the central committee. In response to this invitation, the Philippine weather bureau has been sending to the central station of Strassburg every month a special report on the earthquakes felt in different parts of the archipelago and the microseismic movements registered at the observatory by the Vicentini microseismograph.

At the request of General Sanger, Rev. M. Saderra Maso, S. J., prepared a paper on the Volcanoes and Earthquakes of the Philippines. This paper was made part of the government publication on the census of the Philippines and afterwards printed as a separate pamphlet.

MAGNETIC DEPARTMENT.

This department has kept up its regular work of reducing to absolute values the hourly readings given by the photographic curves of the registering instruments and of arranging them in convenient tables for their publication in the annual report for 1903. We have gone on, too, as usual, preparing for the Monthly Bulletin a summary of the absolute monthly observations of declination, inclination, and horizontal component, with a record of the principal magnetic disturbances occurring each month.

As extra work, we must make mention of our cooperation in the investigation of magnetic disturbances, a task undertaken at the request of M. Smicht, chief of the German magnetic service. It calls for an exchange between the principal magnetic observatories of the world of the photographic curves, in natural size, corresponding to the principal magnetic disturbances, and these curves are brought together and studied at the magnetic observatory of Potsdam. During the year we have exchanged the curves corresponding to the following disturbances: For 1903, those of October 31 to November 2, December 13 to 14; for 1904, those of January 15 to 17, April 1 to 2, May 12 to 14, June 6 to 7 and 15 to 17.

The magnetic department still continues to take part in the investigation of days of magnetic calm, in accordance with the resolution passed by the International Congress of Meteorology in 1900. Every month a list of the days of calm is sent to the secretary of the permanent international committee of meteorology and terrestrial magnetism.

In the beginning of 1904 the director of the observatory of Batavia sent a letter asking for the hourly observations and copies of the photographic curves for several days of February and March, for the purpose of comparing them with the result obtained in the magnetic survey of the islands of Java and Sumatra. His request was attended to and all the data forwarded as soon as possible.

Again a number of observations were sent to Doctor Fritz for his researches on the variation of the magnetic elements over the whole world, those sent including the monthly and annual averages of declination, inclination, and horizontal component covering a period of twelve years. Lastly, the geodetic and coast survey of the Philippines was supplied with the hourly values of declination to facilitate

the work of calculating and reducing the numerous determinations made in different points of Luzon, the Visayas, and Mindanao during the years 1902 and 1903.

On the occasion of the annular eclipse of the sun, which took place in Manila March 17, 1904, this department arranged to take direct readings of the instruments of variation every minute during the three hours of eclipse. The results showed a very regular variation. The day itself was one of great magnetic calm.

Finally, we may mention a practical service done by this section in freely adjusting and testing various compasses and theodolites which were brought here for that purpose by different private individuals or by other bureaus of the insular government.

SECONDARY STATIONS.

This year the secondary stations are the same in number as last year. The absence of part of the personnel of the observatory in America interfered with the regular tours of inspection, which are so useful and even necessary in these islands. Only two hurried visits were taken by the Rev. William A. Stanton, S. J., assistant director, one to Iloilo, Jolo, and Zamboanga, and the other to the southeast to Samar, Leyte, and Cebu, where he visited the stations of Calbayog, Tacloban, Ormoc, and Cebu. In the course of these two visits it became sadly apparent that some provincial boards had little desire or inclination to carry out the requirements of the act of the Commission of March, 1903, bearing on the selection of suitable sites for stations of the first and second class. One provincial board even went so far as to petition the Commission to abolish its station, just to avoid the monthly outlay of ₱15 or ₱20. This parsimonious spirit does not compare favorably with the generosity and liberality of the United States and of all civilized nations in maintaining and extending an efficient meteorological service.

During the year the station of Masbate, which had been rendering voluntary service since 1902, was made official. The third-class station of Biñang was suppressed, and in its place a fourth-class station was erected at San Antonio, in the province of Laguna, at the request of the bureau of engineering. The third-class station of Iba was also abolished and its place given to Masinloc, formerly a fourth-class station. Four voluntary stations have been established.

For the better equipment of the secondary stations, eight registering anemometers of the kind used in the United States Weather Bureau have been procured. They will be mounted in the first-class stations. Various government bureaus and government enterprises having asked for meteorological apparatus, offering at the same time to send their monthly report to the weather bureau, the following were provided with the necessary instruments: The military prison at Malahi; Twin Peaks, or rather the board of works superintending the new road to Benguet (whither also an employee of the observatory was sent to mount the instruments); the bureau of forestry, for two rain stations in Mariveles; the government coal mines in Bataan Island, and the American school-teacher in Guiangan, N. Vizcaya. Besides, a fine mercurial barometer was set up by employees of the weather bureau in the headquarters of the bureau of coast guard, in the building once occupied by the captain of the port of Manila.

There it may serve as a standard of comparison for the barometers of ships which touch at that port.

In the report for 1902–3 a plan was outlined for the erection of a station in Guam, but serious difficulties arose and the plan is still in abeyance. However, thanks to the generous cooperation of the present governor of the island, Hon. G. L. Dyer, something has been done in the line of services beginning with August of this year. The nature of the services will be understood from the correspondence here subjoined. We take this occasion to acknowledge the debt of gratitude the weather bureau and the people of the Philippines in general owe to the honorable Governor Dyer for his generous and intelligent cooperation in this matter.

U. S. NAVAL STATION,
Island of Guam, May 25, 1904.

SIR: Having been appointed governor of the island of Guam, and having assumed charge, I am now in position to offer to cooperate with you in any way in my power. It was my intention to see and confer with you before leaving Cavite recently, but no opportunity presented itself. There are no funds whatever at my disposal, but the officers of the station ship can take any observations you may desire with the instruments they have on board, the usual mercurial and aneroid barometers and thermometers furnished our ships. These observations can be signaled to the cable station at Sumay at fixed times. The question of paying for the messages will have to be arranged at your end. The *Solace* will be returning here from Cavite in about six weeks—quite in time, I should say, for the typhoon season. I am sure you will be able to arrange with the commander in chief of the Asiatic Station, or, in his absence, the senior officer present at Cavite, to send here by the *Solace* observers and instruments, if you desire. They should be stationed at Sumay, where the cable station is, as this point, Agaña, is too distant from the cable station, and communication too slow and difficult. Sumay is on the southwest side of the bay of San Luis d'Apra. The usual method of communication from this point is to ride to Piti, on the northeast side of the bay, and take a boat from there. This is precarious. There is a long and bad road by land. I am thus specific, as the question may arise with you about the best location of an observer. If you have no recent map of the bay and surroundings, there will be one in the office of the coast and geodetic survey in Manila, or Captain Couden, commandant of the Cavite naval station, will get one for you on application. There is a very accurate one recently issued by the Bureau of Equipment, Navy Department.

Please give my regards to Fathers Stanton and Brown, and believe me, very sincerely, yours,

G. L. DYER,
Commander, U. S. Navy, Commandant, and Naval Governor.

The DIRECTOR METEOROLOGICAL OBSERVATORY,
Manila, P. I.

PHILIPPINE WEATHER BUREAU,
Manila Observatory, June 7, 1904.

SIR: Your communication No. 337, dated May 25, 1904, has been received. I beg to thank you most earnestly for your kind offer of cooperating with this observatory in its endeavors to secure the important meteorological observations of Guam. Unfortunately, I am not in a position to make definite arrangements, as the director of the weather bureau has opened negotiations with the cable company, and I am not fully aware how matters stand with regard to the final establishment of a station on Sumay.

But as the typhoon season is at hand, I most earnestly ask of you the favor of cooperation in the following form: Whenever the prevailing wind at Guam comes from a point between east over south to southwest (both included), and the barometer after all corrections have been applied shows 754 millimeters or less, we should be notified by cable according to instructions, which I take the liberty to inclose. As the station ship may possibly not be in possession of reduction tables, I send a copy of those in use here. The telegrams will be paid for by the weather bureau.

Would you please give orders that we be informed as to what time is in use at Guam? If it is standard time there can be no doubt that it is the time of the one hundred and fiftieth meridian, i. e., ten hours east of Greenwich; if local mean time—or rather in any case—we would thank you for the coordinates of Guam according to the latest determinations.

As to the map of Guam, I beg to say that Commander Sewell had the kindness to send us a blueprint copy of same.

I believe it to be the plan of Fr. Algué to have the telegraph operator of the cable company at the old fort to act as observer, and I sincerely hope that arrangements will be perfected before the beginning of the typhoon season of 1905. In the meantime I appeal to you for the cooperation as detailed above, which will be of great importance for the public good.

Do you think that the Germans will ever connect Yap and Ponape with the American cable? Of course, a commercial cable seems out of question, but the German Government does many a costly thing for merely military reasons. With stations at Ponape, Guam, and Yap, the Philippine weather bureau would be in an enviable position indeed.

We should be very thankful to you if you would cause a copy to be made for us of the regular meteorological observations made on board the station ship and forward the same to this office every month. If such copy is not made on Form 105 of the Hydrographic Office, it would be necessary to inform us whether any corrections, and which, if any, have been applied.

Please to pardon me if I seem to ask rather much. It is after all not private interest, but the consideration of the public good, which prompts me to make these requests.

Very respectfully,

M. SADERRA MASÓ, S. J.,
Acting Director.

Commander G. L. DYER, *U. S. Navy,*
Governor of Guam.

Instructions for the sending of weather dispatches from Guam Island.

I. WHEN NECESSARY.

1. Whenever the reading of the mercurial barometer, after having been corrected for instrumental error (if any), for elevation of the cistern above sea level, and for temperature, is 754 mm. or less, while at the same time the wind blows with some constancy from a point between east over south to southwest.

2. Whenever, with a continued low barometer (though it does not reach 754 mm. at the time of minimum), strong winds blow steadily from a point between south and southeast, while at the same time the swell of the sea comes from west to southwest.

3. Whenever, with a barometer as described under No. 2, and considerable winds blowing from a point between south and southwest, the swell comes from northwest.

II. WHAT SHOULD BE TELEGRAPHED.

The dispatch should give the following items necessary for a complete understanding of the weather condition on the island:

1. The date and hour of the observation forwarded.
2. The height of the mercurial barometer, corrected for instrumental error, elevation above sea level, and temperature.
3. The state of the sea and direction of the swell.
4. The direction and force of the prevailing wind.
5. The form of the clouds, the direction from which they come, and their amount.

III. HOW TO TELEGRAPH.

Since the weather dispatches from Guam have to be paid for, it is important to make them as short as possible. The rules of the cable company, allowing ten figures as the equivalent of one word, all the required information can be conveyed by two groups of ten figures each, making the whole telegram, inclusive of the address, four words.

Address—"Observatory Manila," two words.

FIRST GROUP.

The first group of ten figures is to contain the date and hour of observation, the reading of the barometer, the state of the sea, and the direction of the swell, thus:

1. *Date, etc.*—The name of the month is superfluous, as it can never be doubtful in what month the telegram was filed for transmission; hence it is omitted. The day of the month and the hour of observation should each occupy two places, the day commencing at midnight and the hours being counted from 0 to 23. Thus, 9 a. m. would be written 09, but 2 p. m. had to be 14, and 11 p. m. similarly 23, 00 expressing midnight.

The places not occupied by figures should be invariably filled by zeros, as otherwise the telegram becomes unintelligible. For instance, if 1521536 reads according to code: "On the 15th at 9 p. m. the corrected barometer reading was 753.6 mm.," the same barometer if observed at 9 a. m. of the 5th would have to be cabled, 0509536, since, if omitting the zeros, we would get 59536, which it would be difficult to interpret. This remark holds good for all meteorological elements.

2. *The barometer.*—The corrected barometer readings should be telegraphed to tenths of a millimeter, 700 mm., and the decimal point being always understood, it suffices to send the tens, units, and tenths; hence three figures will give the barometer down to tenths, 741.8 becoming 418, and 740.0 simply 400.

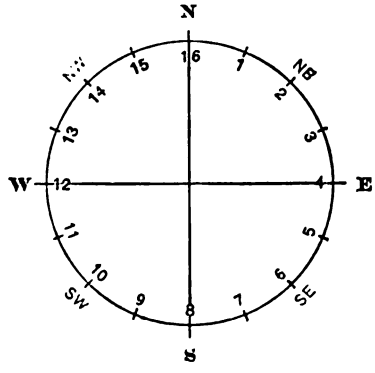
3. *The state of the sea.*—The state of the sea should be given by one letter, taken from "Sea Symbols," to be found on page 6 of Form 105, issued by the U. S. Hydrographic Office.

4. *The direction of the swell.*—The direction from which the swell of the sea comes should be indicated by two figures, in accordance with the instruction and diagram given below for transmitting the direction of the wind: thus, L15 reading, "Long rolling sea from north-northwest."

SECOND GROUP.

The second group of ten figures will contain the direction of the wind, its force, the form of the clouds, their direction and amount, each item expressed in two figures.

1. *The direction of the wind.*—By direction of the wind is understood the direction of the prevailing winds, not the varying directions during squalls or the actual direction at the moment of observation, unless the latter is identical with the prevailing. The direction of the wind should be given according to 16 points of the compass, north-northeast being designated by 01, northeast by 02, etc., north being 16. (See diagram.)



2. *The force of the wind.*—The force of the wind is to be expressed according to Beaufort's scale. (See Form 105, Hydrographic Office, p. 7.) But a zero must be placed before the figure whenever the force is less than 10; thus, 00 would be "perfect calm," 03 a gentle breeze, 06 a strong breeze, etc.

3. *Cloud forms.*—The form of the prevailing clouds, supposing that there are several forms present at the time of observation, should be cabled by means of the numbers set opposite each name in "Abbreviated cloud definitions" on page 6, and "Description of cloud forms" on page 8 of Hydrographic Office Form 105. But again, a zero should be prefixed to Nos. 1–9: thus representing cirrus by 01, alto-cumulus by 04, cumulo-nimbus by 09, but stratus by 10.

4. *Cloud directions.*—The direction from which the clouds move should be given in exactly the same manner as the direction of the wind. "No motion perceptible" is expressed by 00. If several forms of clouds are present, the direction of the higher form should be given, though this may not be the prevailing form mentioned under No. 3.

5. *Amount of clouds.*—In estimating the amount of clouds 00 denotes a perfectly clear sky, 10 a sky completely covered. (See Form 105, p. 6.)

These dispatches should be filed as official telegrams, to be paid for at Government rates by the Philippine Weather Bureau.

U. S. NAVAL STATION,
Island of Guam, August 16, 1904.

SIR: The receipt is acknowledged of your letter of June 13, 1904, in regard to furnishing the Manila Observatory with meteorological observations of Guam. I have directed the executive officer of the station ship *Supply* to comply, as far as practicable, with the terms of your request as expressed in your letter and in the instructions accompanying it.

Arrangements have been made with the superintendent of the cable company for the prompt transmission of all messages to you; and a code of signals has been agreed upon with him so that, in case of sudden bad weather, it will not be necessary for the station ship to send a boat to Sumay with the cable message, it being sufficient to hoist certain flag signals on the *Supply*, which signals being read at the cable station will form the message to be sent you. As it will, however, require 11 hoists for a 4-word message, this method will only be resorted to when absolutely necessary, as, for instance, if bad weather should come on suddenly it might be impracticable to send a boat to Sumay, while, at the same time, a few hours would probably make a great difference in the value of the information cabled.

A copy of the regular meteorological observations on Hydrographic Office Form No. 105 will be forwarded to you each month from the U. S. S. *Supply*.

The time used here is local mean time, 144° 43′ 30″ E.

I am inclosing with this a blueprint of the island of Guam, which may be of use to you.

Being fully aware of the great importance of correct meteorological information, especially in the typhoon districts, I am only too glad to do anything in my power to forward the good work, and I sincerely trust that you will not hesitate to call upon me whenever I can be of assistance to you in your work.

Very respectfully,

G. L. DYER,
Commander, U. S. Navy, Commandant and Naval Governor.

The DIRECTOR, MANILA OBSERVATORY,
Philippine Weather Bureau, Manila, P. I.

THE PHILIPPINE WEATHER BUREAU AT THE LOUISIANA PURCHASE EXPOSITION IN ST. LOUIS.

PRELIMINARY WORK.

On April 11, 1903, the director of the observatory of Manila entered into a contract with the exposition board in the Philippines to go to St. Louis and prepare the exhibit of the weather bureau according to the details specified in the contract and approved by Governor Taft. One important condition was to be fulfilled before my departure, and that was to have certain preliminary work done on our site at the World's Fair, so that on my arrival in St. Louis I could begin at once the immediate preparation of our exhibit. To secure this, Governor Taft, on September 26, sent the following cablegram to the Secretary of War, Washington, D. C.:

Father Algué wishes to know if foundations for large relief map are ready in exposition grounds.

TAFT.

Another cablegram was sent to the Secretary of War on October 10:

Father Algué wishes foundation finished. Will start next month with two experts. Desires observatory covered.

TAFT.

Colonel Edwards sent answer to Governor Taft October 12:

Referring to your telegram from your office of 10th instant, Algué's foundation will be ready.

EDWARDS.

To urge on the preparation in St. Louis, the Rev. Marcial Solá, S. J., secretary of the weather bureau, who was in St. Louis on leave of absence, took occasion to visit Mr. Isaac Taylor, the director of works of the World's Fair, and discuss our plans with him, for the purpose of showing him how necessary it was to get the preliminary work under way as soon as possible. This was in the beginning of September. A little later, on October 14, an order was sent to Rev. Baltasar Ferrer, S. J., assistant director, who also was in the United States, on leave of absence, to repair at once to St. Louis to supervise the preparation for our exhibit in the exposition grounds. I myself left Manila November 20, taking with me Mr. Augusto Fuster, an artist, and Mr. Román Trinidad, a mechanic. By January 1 we were in St. Louis. Thanks to the diligence of Fathers Solá and Ferrer, the foundations of the large relief map were laid before the end of 1903, and the station itself and the pier of masonry for the universal microseismograph were well advanced by January 1, 1904.

For some time after my arrival I found it impossible to do any work in the open air, the ground being covered with snow and the weather extremely cold; so I profited by the delay to get some tools and put the mechanic repairing several pieces of apparatus which were injured on the way. Then we prepared another collection of woods to replace the one shipped from the Philippines, which reached here in a state of utter ruin. Mr. Fuster was meanwhile at work on an oil painting of Father Faura, which I wanted to place in our station, and after that he was employed in illuminating our collection in four albums of photographs of the Philippines.

The day after our arrival in St. Louis Doctor Wilson called to bid me welcome, and together we visited the grounds of the Philippine concession, where I had an opportunity of seeing for myself the progress made in the preparation.

On the way from Manila one of our mercurial barometers was broken and also a glass on one of the aneroids. These were repaired and the expense charged to the government. The cases containing the apparatus were shipped as baggage from San Francisco to St. Louis to insure the safest possible transit. While our building was in course of construction and we were busy with the various details mentioned above, I found some spare time to give the finishing touch to a pamphlet on the Climate of the Philippines. At the end of January I was called to Washington by Colonel Edwards, chief of the insular division, to confer with General Sanger, chief of the census. We met in Washington, in the office of Colonel Edwards, and as a result of our conference I remained several days in the city, spending much of the time with General Sanger in the Census Bureau. On one of my visits to Colonel Edwards I was presented to Mr. James Hill, the railroad magnate, who was then in Washington discussing with the Secretary of War the prospects for new railroads in the Philippines.

VISITS TO THE SECRETARY OF WAR AND TO THE PRESIDENT.

On February 5 I called upon the new Secretary of War, our esteemed ex-Governor Taft, and the following day I had the honor and great pleasure of a visit with the President. The following letter of introduction had been kindly given me by Governor Taft:

OFFICE OF THE CIVIL GOVERNOR OF THE PHILIPPINES,
Manila, November 18, 1903.

MY DEAR MR. PRESIDENT: This letter will introduce to you Father José Algué, the Jesuit priest who is at the head of our weather bureau and who is, I believe, one of the most eminent meteorologists of the world. He has been the principal means of organizing our meteorological service, the importance of which in the commerce of the Orient can not be sufficiently valued. Father Algué is visiting the United States for the purpose of making the Philippine exposition in St. Louis as complete as possible, and I respectfully recommend him to your kind attention.

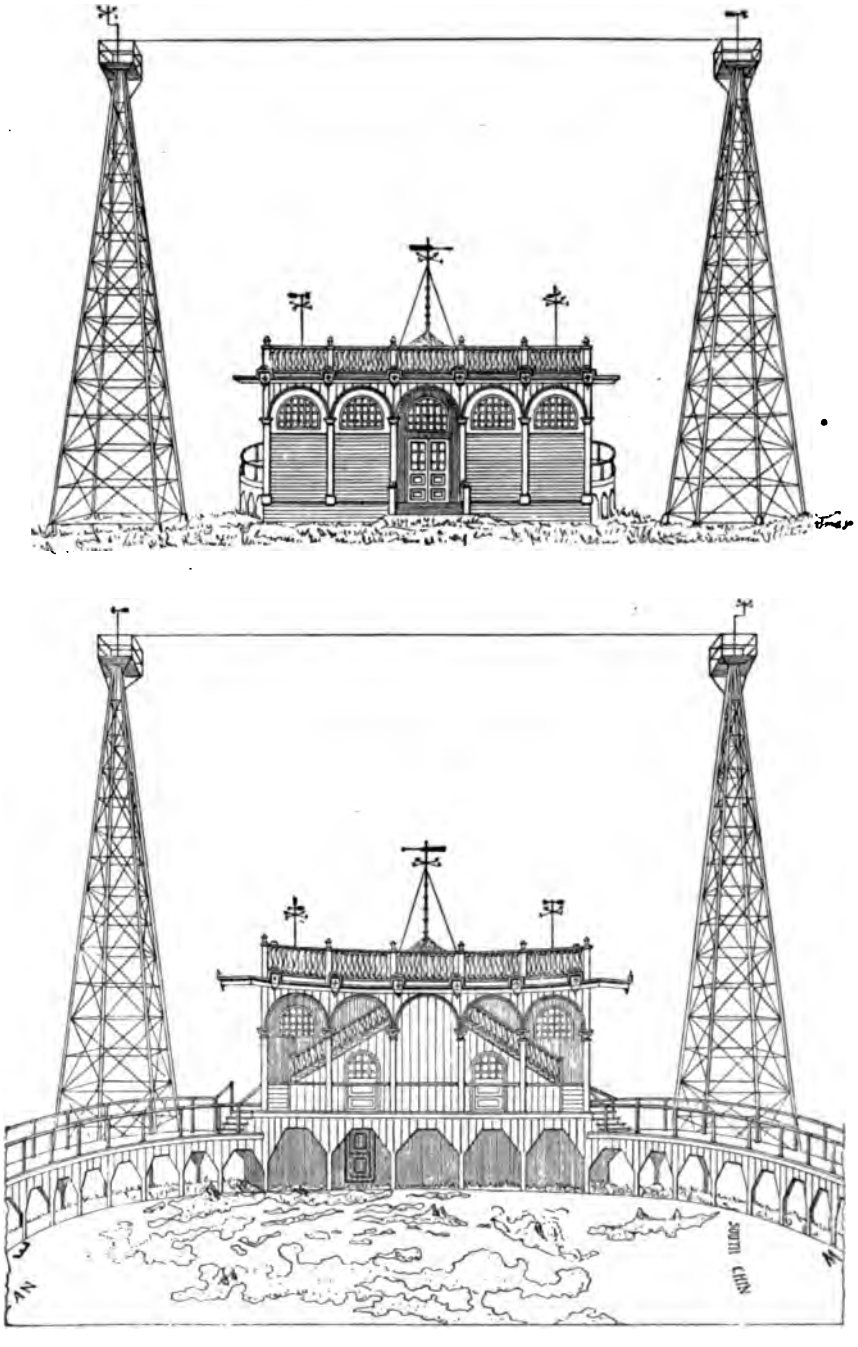
Yours, most sincerely,

WILLIAM H. TAFT,
Civil Governor.

Hon. THEODORE ROOSEVELT,
President of the United States, Washington, D. C.

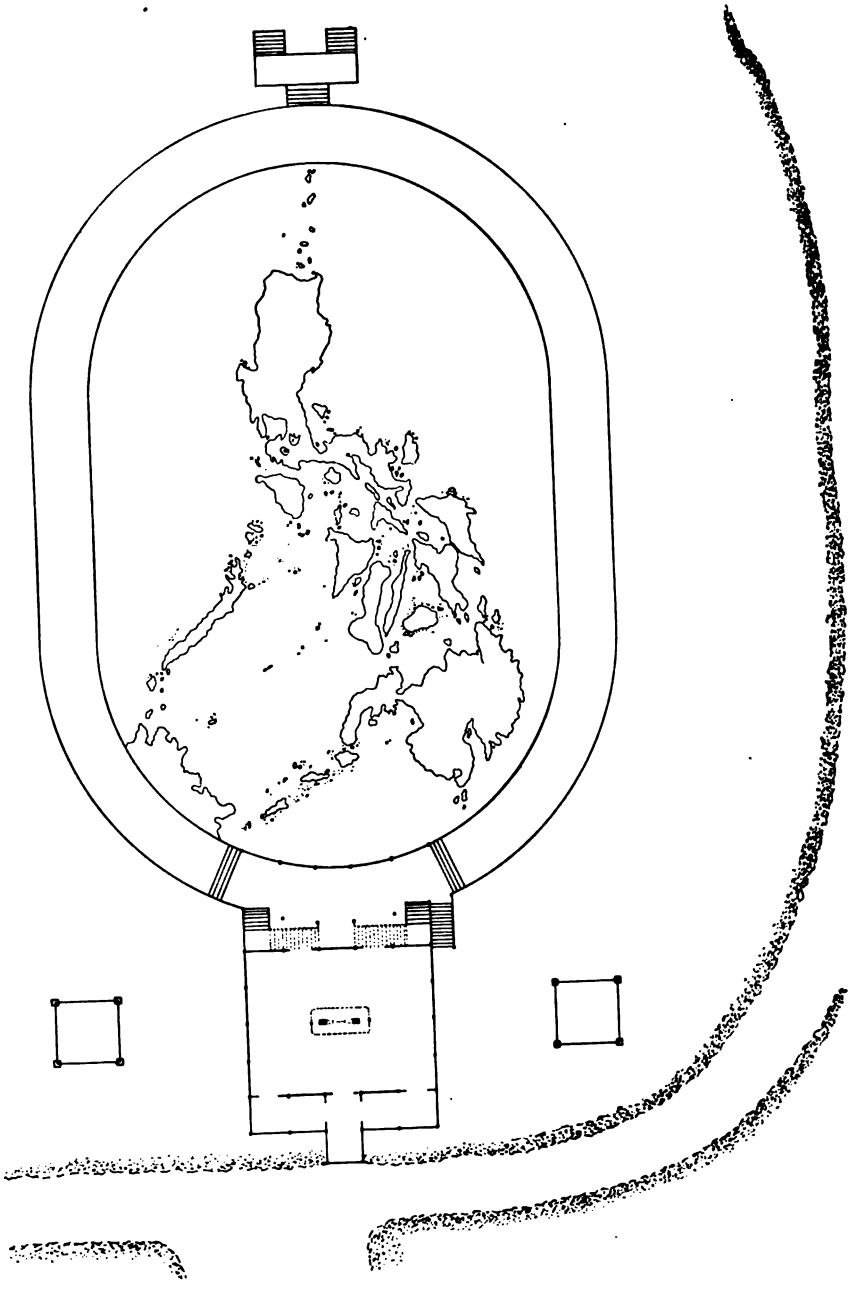
PREPARATION OF THE LARGE RELIEF MAP.

On February 13 I was back in St. Louis, and by the 23d two more Filipinos had arrived from Manila to help in preparing our exhibit and especially in the work on the map. On the latter we started at



FATHER ALGUÉ'S RELIEF MAP OF PHILIPPINE ISLANDS AT ST. LOUIS EXPOSITION.





FATHER ALGUÉ'S RELIEF MAP OF PHILIPPINE ISLANDS AT ST. LOUIS EXPOSITION.



once, measuring off the meridians and parallels on the concrete base or foundation and marking them with wires. This done, we numbered the square degrees in conformity with the index map which we had brought with us ready drawn. Then we began to project, square after square, the maps already prepared at Manila on the enlarged scale, which is 18 mm. per kilometer in the horizontal and 18 by 8=144 mm. in the vertical direction. The linear length of a degree of parallel in latitude 5° north is 2 meters, while in latitude 21° north it is approximately 1.77 meters, the lengths of the degrees on the parallels comprised between these extremes decreasing proportionally.

The outlines of the principal islands and the positions of the smaller ones we laid down first in plaster of Paris and then went over them again with the special composition which was to form the surface of the relief. This operation kept us busy for five to six days. The weather was decidedly against us, for the intense cold not only made it difficult to work, but also prevented the proper setting of the cement. We availed ourselves of our opportunities and of the milder days to such extent that on the latter we worked from 8 o'clock in the morning until 5 or 6 o'clock in the evening, permitting ourselves only one interruption of half an hour for lunch, which we took in a small compartment, something like a workshop, situated on the ground floor of the station building. In this room we managed to have a stove installed, which enabled us to warm ourselves when the inclemency of the weather forced us to retire from our work.

The contours being finished, we proceeded to mark the positions and heights of the principal mountains by means of vertical wires of slightly less length than the height of the mountain whose axis each was to form. Around each of these wires we built up a rough sketch of the mountain by means of broken stone and cement or, in the case of the highest mountains, of wood, stone, and cement, this indicating mountain ranges and valleys. After this groundwork had well settled and dried we covered the whole with a layer of the special composition spoken of, modeling the valleys and mountain ranges as indicated by the watersheds of the principal rivers and their tributaries, which were taken from the corresponding maps. This was the most important part of the work and occupied us until nearly the middle of April. When the composition was perfectly dry we gave the whole structure a heavy coating of red lead. The surface of the oceans was found to be rather rough and had to be smoothed by a new layer of cement, which, at my request, was ordered by the exposition board. This accomplished, the surfaces representing the sea were painted blue and the islands ground color, which, interspersed with green and touched up with some colors peculiar to the Tropics, gave to the map an aspect similar to that which the archipelago offers. The rivers were painted with aluminum bronze, as were also the lakes. Our aim was to avoid placing any name on the map which was not simply necessary, as otherwise confusion would have resulted. Consequently, we gave only the names of the islands, of the provinces and their capitals, and of the principal seas, straits, and lakes. Of cities and towns other than capitals of provinces the map gives the location and, by the size and form of the sign denoting them, their relative size, but not the name. By the end of April nearly the whole was completed.

ARCH FOR THE MICROSEISMOGRAPH.

Already, toward the middle of April had been finished the arch of masonry in the center of the hall so that the microseismograph could be installed. The glass plates, however, closing in the sides could only be placed in the beginning of June. Nearly all the instruments had been set up by the end of April.

DESCRIPTION OF THE STATION.

The station of the weather bureau consists of three principal parts. The first of these is formed by the huge mass of concrete, built up in the shape of a spherical segment of one base, having elliptical boundaries and surrounded by a gallery which follows the outline of the concrete. This gallery has a width of 2½ meters, while its height above ground varies, being about 2 meters nearer the building and 3½ meters at the farther end, which fact is due to a slight declivity of the ground, as the floor of the gallery is level. An elegant brass railing runs along this gallery on both sides. The major axis of the ellipse bounding the map measures 35 meters, the minor axis 25 meters. The area represented on the map is comprised between the parallels 4° 30′ and 22° latitude north, and the meridians 114° and 126° east of Greenwich. Hence a degree nearer the equator has a linear value of two meters, corresponding to an equatorial scale of 18 mm. per kilometer or 1.25 inch per mile.

The second part of the station consists of the building, the base of which is a square of 9 meters length and width. The front elevation is about 4 meters, while the rear, which looks upon the map, has a height of 7 meters. From either side of the gallery one may ascend to a balcony, which has the width of the gallery but the length of the edifice. From this balcony two stairs, one on either side, lead to a terrace forming the roof of the building on which are installed various instruments, as we shall see. On the ground floor of the edifice is a room which serves for the storage of drawings, maps, and implements.

The third part, finally, consists of two elegant towers of galvanized steel, some 30 meters high, which flank the front of the building. Between the tops of these towers are stretched the wires which serve as collectors or antennæ of the ceraunographs.

SECTIONS OF THE STATION.

Among these three constructions, occupying an area of approximately 1,500 square meters, are conveniently distributed the various sections which make up the exhibit of Manila Observatory at the World's Fair of St. Louis, viz, the geographical section, the seismic section, and the meteorological section.

GEOGRAPHICAL SECTION.

The geographical section comprises the large relief map of the Philippine Archipelago in the open air and 8 smaller ones of the same group, likewise in relief, placed within the station building. The dimensions of the smaller maps are 2 by 3 meters. Each of these maps gives information on a different subject, as follows: (1) The religious and political divisions of the archipelago; (2) the regions,

inhabited by the different races and tribes; (3) mineral resources and mineral springs (hot and cold); (4) forestry and agricultural products of the islands; (5) the distribution and relative frequency of earthquakes; (6) the distribution of precipitation during the month of August, which is typical of the rainy season; (7) the same during February, typical of the dry season; (8) the meteorological districts and the stations of the Philippine weather bureau.

This section also contains a representation in relief of the volcano Mayon and a similar one of the volcano Taal, with their respective surroundings; moreover, a collection of ancient maps of the Philippines, taken from the history of the islands by Father Colins, S. J., and annotated by Father Pastells. These maps are in frames and distributed in the interior of the building. On the balcony before mentioned is exhibited a relief map of the bay of Manila, on a scale about double that of the large map.

To illustrate, the geographical section serves a collection of pearl shells, on each of which is painted in oil, from photographs, a different scene or type characteristic of the Philippines or their inhabitants. Each shell is mounted on a different kind of Filipino wood. The collection numbers 120 shells and is artistically distributed through the interior of the station.

SEISMIC SECTION.

The seismic section comprises a Vicentini microseismograph and a seismometer with peculiar suspension, which has been devised by Father Suarez, S. J. The microseismograph is mounted in the middle of the hall within an arch resting upon a solid foundation of concrete, which goes deep into the ground and is isolated from the building. Two large glass plates, one on either side of the arch, protect the instrument.

METEOROLOGICAL SECTION.

The meteorological section is, naturally enough, the most complete and most important. In this section the following instruments are exhibited:

In the interior.—A complete anemograph by Friez, with quadruple registering apparatus, which latter permits of recording on one sheet of paper not only the direction and velocity of the wind, but also the amount of rain and the time of sunshine; a Richard mechanical anemograph, registering the direction and velocity of the wind; a kinemo-anemograph by Richard; the ceraunograph (lightning recorder) invented by Father Odenbach, S. J., of Ignatius College Observatory, Cleveland, Ohio; the ceraunograph devised by the late Father Schreiber, S. J., of the Haynald Observatory, Kalocsa, Hungary; various apparatus used at the stations of the Philippine weather bureau, viz, mercurial barometer used at first-class stations, Richard barograph, Tonnelot barometer (mercurial) used at second and third class stations, Algué typhoon barometer (mercurial), Algué barocyclonometer, maximum and minimum thermometer, Algué refraction nephoscope, and solar chronometer by Fléchet. All these instruments are placed on special supports in the interior, except the barometers, which are hung against the masonry arch. The revolving parts of the Friez anemograph and the kinemo-anemograph are

located one on each of the two towers, at an altitude of about 35 meters from the ground, and are connected by electric wires with the batteries on the ground floor and registering apparatus in the hall of the station. On the terrace are placed the shelters for the registering hygrometer for the maximum and minimum thermometers and for the whirling psychrometer. There is also to be seen the pluviometer used by the Philippine weather bureau, a Richard registering pluviometer, and the heliograph (sunshine recorder) of Campbel. The wheel of the Richard mechanical anemograph rises about 4 meters above the railing of the terrace on the north, while, for the sake of symmetry, a Wild anemometer, such as is used at the third-class station of the weather bureau, occupies the corresponding position on the south. In the center of the terrace is erected a Friez anemoscope having a height of approximately 6 meters above the railing. The station has two clocks—one showing the standard time of St. Louis, which operates the chronograph of the Vicentini microseismograph and serves to regulate the clockworks of the various registering instruments, the other giving the official time of the Philippine Islands, which is fourteen hours in advance of the St. Louis time.

By way of ornamentation the station shows on a conspicuous place a large oil painting, the portrait of Father Faura, S. J., the founder of Manila Observatory, and above each of the two small doors which connect the hall with the offices, respectively, the portraits of Monsignore Harty, archbishop of Manila, and of Monsignore Glennon, archbishop of St. Louis. In the interior of the station there are also two magnificent maps of Mindanao, lent by the Jesuit mission of the Philippines, and a series of maps of the archipelago, showing the average distribution of rainfall in the islands, the differences in mean temperature, the mean trajectories of the various types of typhoons, and the variations of the magnetic elements; also a number of facsimiles of earthquake records and a collection of photographs belonging to the observatory. The Ateneo de Manila exhibits a terra-cotta bust of Father Guerrico, S. J., which was modeled by Rizal when he was an exile in Mindanao. As specimens of Filipino art are shown a beautiful surplice of embroidered piña cloth and a richly carved pearl shell. A collection of Philippine woods comprises 150 specimens, some of them not yet classified. The hall contains also two tables, which form part of the exhibit. One of these is circular, of 1.58 meters diameter, the top being one piece of bolonguita wood; the other, rectangular, is made of narra. On the former is placed the book in which the more distinguished visitors are invited to inscribe their names; on the latter are displayed all publications of Manila Observatory, the history written by Father Colins, S. J., which has lately been annotated and published by Father Pastells, S. J., and El Archipiélago Filipino, 2 volumes, with atlas.

These different sections are in the evening profusely illuminated by electric light. The elliptical gallery surrounding the map carries four arc lights with good reflectors, which shed a flood of light upon the map. On the towers, outlining their structure, are distributed 1,080 incandescent bulbs; also the doors and windows are picked out in lights. The interior is brilliantly lit up by groups of lamps artistically placed.

After my departure from St. Louis the exhibit is in charge of Mr. Roman Lacson, an able Filipino graduate of the law school of George-

town University, Washington, D. C., who will receive visitors and explain the exhibits. Mr. Roman Trinidad, mechanic of the weather bureau, has charge of the apparatus and observations, while a porter and a servant look after the cleanliness of the place and its immediate surroundings.

A guard of Filipino constabulary maintains order and guards the instruments and other exhibits. Written instructions drawn up by me guide those in charge of the station.

ACKNOWLEDGMENT TO THE CENSUS BUREAU.

We can not let pass this occasion of acknowledging our indebtedness and expressing our gratitude to Maj. Gen. J. P. Sanger, U. S. Army, for the valuable assistance given us in preparing the map. The nature of his help and the generous spirit in which it was tendered will be best understood from the following letter:

WAR DEPARTMENT, PHILIPPINE CENSUS BUREAU,
Washington, D. C., February 6, 1904.

Rev. JOSE ALGUÉ, S. J.,
Director Philippine Weather Bureau, Washington, D. C.

MY DEAR FATHER ALGUÉ: Referring to your letter addressed to me shortly before I left Manila, September 3, 1903, and to your letter of January 22, 1904, I beg to inform you that it will be practicable to furnish you the following information on or before March 1, 1904, viz:

First. The names and locations of pueblos, barrios, and rancherías.

Second. The population of the provinces, pueblos, barrios, and rancherías from the rough count made in the United States Census Office; names of the different wild tribes, and the population and location of each.

The approximate areas of cultivated lands and the principal crops in each province can not be furnished much before the 1st of July next. In this connection your attention is invited to the inclosed true copy of a letter from the Director of the United States Census, dated January 28, 1904, in regard to the state of the tabulation.

I have instructed Mr. Henry Gannett, assistant director of the Philippine census, to loan to you the census maps prepared under my direction September, 1902. These will give you the location of the pueblo towns and the direction and distance of each barrio from them. They are not strictly accurate, but were sufficiently so for my purpose in forming the enumeration districts.

You may find them of use in locating the minor civil divisions on your map, but I would suggest that you do not rely too much on their accuracy.

Any other information which you may wish from the census records I shall be only too glad to furnish you, as an indication of my great personal regard for you and as an acknowledgment of the valuable services rendered by you in this census.

Very truly yours,

J. P. SANGER,
Major-General, U. S. Army, Director Philippine Census.

The letter referred to in this letter is as follows:

UNITED STATES CENSUS OFFICE,
Washington, D. C., January 28, 1904.

Maj. Gen. JOSEPH P. SANGER,
Director of the Philippine Census.

SIR: In further reply to your communication of January 18, 1904, concerning the publication of a bulletin giving the population of the Philippine Islands by provinces, pueblos, barrios, and islands, I beg to state that it is estimated that the tables of aggregate population to be included in said bulletin will occupy 70 pages. These tables are now in course of preparation, and will be published, with such introductory text as you may furnish, on or before April 1 next, as stated in my letter of the 21st instant.

The results to be derived from the machine tabulation of the population returns of the Philippine census will be completed approximately as follows:

First. The tables containing the data required for provinces, pueblos, and islands of list 1, between June 15 and July 15 next.

Second. The tables containing the data required for provinces and islands of list 2, on or before December 1 next.

The tabulation of agricultural returns of the Philippine census will be completed approximately as follows:

First. February 15: Total number of farms; total area; cultivated area; area cultivated prior to 1896; area in woodland, classified by color and tenure and by size of total area, by provinces.

Second. February 23: Total number of farms; total area; cultivated area; area cultivated prior to 1896; area in woodland, classified by color and tenure and by size of cultivated area, by provinces.

Third. March 1: The tabulation of the above data by islands.

Fourth. June 30: Tabulation of live stock on farms and not on farms, and crops, will be taken up at the completion of the tabulation of the farm area, and will be finished not later than July 1.

Very respectfully,

S. N. D. NORTH, *Director.*

A true copy:

J. P. SANGER,
Major-General, U. S. Army, Director Philippine Census.

ACKNOWELDGMENTS TO THE COAST AND GEODETIC SURVEY.

We must also acknowledge our debt of gratitude to the United States Coast and Geodetic Survey and its branch in the Philippines, for the very great assistance they rendered us in furnishing all their latest maps and publications bearing on the geography of the Philippines. This help enabled us to introduce the very latest data into the great relief map at the World's Fair.

OPENING OF THE WORLD'S FAIR.

April 30 took place the opening of the World's Fair, in which the Honorable Secretary of War, Wm. H. Taft, took part as representative of the President of the United States. A few hours after the termination of the official ceremonies, Secretary Taft paid a visit to our station, and was so well pleased that he promised to bring all his friends from Ohio who had accompanied him from Cincinnati to St. Louis, to see our exhibit. These gentlemen comprised nearly all the members of the Commercial Club of said State. Mr. Taft made good his promise during the afternoon of May 2, when he brought to the station of the Philippine weather bureau that prominent assembly, together with some distinguished persons from St. Louis, the whole party, numbering about 70 gentlemen and a few ladies. Having been requested to explain the map to this brilliant assembly, I led them around the gallery and pointed out to them the points of special interest. I called special attention to the great valley of the Agusan and the Bay of Davao, the theater of the present missionary efforts of the Jesuits, to Lake Lanao, and the districts inhabited by the Moros. Thus we passed all around the map. When leaving I was obliged to take a place in the carriage conveying Secretary Taft; the director of the exposition, Mr. Francis, and the governor of Ohio, and make with them the tour of the rest of the Philippine exhibit.

By the time the exposition opened my work was nearly over and I was anxious to get back to the observatory, but circumstances arose which made it impossible to get away before the end of June.

This delay I knew would cause considerable inconvenience at the observatory, where the regular work of the weather bureau was proving too burdensome to the men there. On the other hand, as I say, strong reasons urged my staying in St. Louis. So I wrote to Colonel Edwards, chief of the Insular Bureau, explaining my position in the following letter:

OFFICE OF THE
PHILIPPINE GOVERNMENT BOARD IN THE UNITED STATES,
FOR THE LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, 1904.
St. Louis, May 1, 1904.

Col. C. R. EDWARDS, *Chief Insular Division.*

MY DEAR COLONEL: The inauguration of the World's Fair was a great success. In the Philippine exhibit things were not ready, but when ready we shall have a special opening, at which we expect you to be present. Although I have everything prepared, visitors will not be allowed to enter our station before the Philippine section is formally opened. I had the honor of a visit from Secretary Taft yesterday afternoon and he was very well pleased with the large map. He promised to call again.

I have letters from Manila urging my return, on the ground that my assistants are overworked and that Secretary Worcester fears our ordinary publications will suffer some delay. We are here, four employees of the Philippine weather bureau, engaged in a work which, I think, will do honor to the insular government and to the bureau, but it is evident that the men left at the observatory are overburdened, or at least feel the strain very much, especially at this season of the year, during May and June, which, as you know, is the worst in Manila. So I am anxious to get back, even though quite tired out and sorely in need of a vacation, a luxury I have not enjoyed since the establishment of the bureau. But on the other hand I do not see how I can easily leave here before July. For I have had already, and I expect to have, very important visitors from home and abroad, and as some of the instruments are new and strange I should be here to explain everything and satisfy the visitors. And with the people coming in crowds to see the map—so much so that it attracted the attention of Secretary Taft—a few words of explanation are often necessary and always welcome. The Philippine lawyer whom I intend to put in charge of our station will not be ready until the end of June. I think, therefore, that a few words from you to Secretary Worcester explaining the situation here will satisfy him and the men at the observatory that my presence is needed in St. Louis. And I shall remain here willingly, as long as it seems necessary, under your orders. I respectfully request you to do this.

I intend to send two of the men here to Manila after May 15. On account of the Russo-Japanese war they consider it safer to go from San Francisco to Manila on a Government transport. Will you please give the necessary orders for their transportation on some transport as soon as convenient after May 15.

I remain, very sincerely, yours,

JOSÉ ALGUÉ, S. J.,
Director of Philippine Weather Bureau.

To this letter, Colonel Edwards replied:

WAR DEPARTMENT, BUREAU OF INSULAR AFFAIRS,
Washington, D. C., May 5, 1904.

MY DEAR FATHER ALGUÉ: My views, as well as those of the Secretary, are set forth in the inclosed copy of a letter which has just been written to Secretary Worcester and it is self-explanatory.

I would suggest that you conform yourself to an affirmative answer to our letter to Secretary Worcester, anyway until you hear from us to the contrary.

* * * * * * *

The letter to Professor Worcester is as follows:

WAR DEPARTMENT, BUREAU OF INSULAR AFFAIRS,
Washington, May 5, 1904.

MY DEAR SECRETARY: I inclose to you herewith a letter which has just reached me from Father Algué, who, as you know, is in St. Louis in charge of the relief map of the islands, and the exhibit of the weather bureau. It is self-explanatory.

I can add, however, that this matter has been brought to the attention of Secretary Taft, who is of the opinion that the importance of the results which can be accomplished through the work of Father Algué at St. Louis is such that every effort should be made so that he can continue on at St. Louis, anyway until you can reconsider the matter and advise us. In fact, I understand the Secretary conveyed this opinion to Father Algué at the time of his visit to St. Louis the early part of this week. The work under him is one of the features of our exhibit, which can certainly be said to be the most interesting and popular of all the attractions at St. Louis.

I am sure you will appreciate the good work which Father Algué can do at St. Louis and that you will try to adjust the matter accordingly.

He will leave by July 1.

Very sincerely, yours,

C. R. EDWARDS,
Colonel U. S. Army, Chief of Bureau.

Hon. DEAN C. WORCESTER,
Secretary of the Interior, Manila, P. I.

OPENING OF THE PHILIPPINE EXHIBIT.

The official opening of the Philippine concession at the World's Fair took place on June 18. I was invited to open the exercises of the day with the usual invocation, and I accepted. The Government was represented by Col. C. R. Edwards, chief of the Bureau of Insular Affairs. Among our guests were the Secretary of the Treasury, the exposition board, the board of the Philippine exposition, many Senators and Congressmen, all the Filipinos of the exposition, and a great concourse of people.

The next day, June 19, I left St. Louis for San Francisco, and on July 1, boarded the transport *Sherman* for Manila. We reached Manila August 2.

APPENDIX N.

REPORT OF THE ACTING CHIEF OF THE ETHNOLOGICAL SURVEY.

DEPARTMENT OF THE INTERIOR,
ETHNOLOGICAL SURVEY FOR THE PHILIPPINE ISLANDS,
Manila, September 1, 1904.

SIR: I have the honor to submit the third annual report of the ethnological survey for the Philippine Islands.

The first two years after the organization of the survey were spent largely in field work, in exploring those parts of the islands which are occupied by pagan and Moro tribes, and in gathering information about the country and the people. A considerable amount of work was also done in the preparation of papers for publication based upon the data gathered during the work of exploration. Throughout the past year all field work which has been carried on has had direct reference to the preparation of the exhibit for the exposition at St. Louis. In addition to this, work has been done in connection with the census, a number of papers have been prepared for publication, and work advanced on still others which are not yet in press.

There have been during the year several changes in the personnel of the survey and on the occasion of each change some time has elapsed between the occurring and the filling of the vacancy. These changes have hindered the work of the survey.

WORK OF THE CHIEF OF THE SURVEY.

During the period from September 1 to October 13, 1903, Doctor Barrows, at that time chief of the survey, was engaged in writing his annual report and in work connected with the ethnologic exhibit for the St. Louis Exposition. The great mass of material illustrative of tribal life which had been brought together from various parts of the islands by special collectors needed arranging and labeling before it was packed for shipment. This necessitated a great deal of personal attention from the chief. In spite of his efforts, however, it was impossible to complete the card catalogue of this collection before the departure of Doctor Niederlein for the United States. The failure to complete the catalogue was regretted, because the work could have been done more accurately in Manila than in St. Louis and because the value of such a collection depends to a great extent on the labels.

On August 13, Doctor Barrows was appointed general superintendent of education, but he was allowed two months as chief of the survey to close up his work. Doctor Jenks was then appointed chief. Immediately after his appointment he continued the work on which

Doctor Barrows had been engaged, classifying the ethnologic collection for St. Louis, and correcting and extending the catalogue. He was at the same time occupied in doing the final work on his paper, "The Bontoc Igorot." As he was expecting to be ordered to the United States to help to install the Philippine exhibit at St. Louis, it seemed best for him to make a hasty trip to the southern islands in order to familiarize himself with the Moro and pagan population and their culture that he might be able to arrange the exhibit to better advantage. About the middle of November he left Manila for Mindanao and returned two months later.

Authority had been given by the civil governor directly to make contracts for taking parties of Manobo, Bagobo, Lanao Moros, and Samal Moros to St. Louis. Acting under this authority, Doctor Jenks arranged with Mr. Frederick Lewis to get together a party of Samal Moros, with Mr. Charles H. Wax a party of Lanao Moros, and Mr. Walter Gerbrich a party of Bagobo. Mr. Gerbrich was later relieved by Mr. Carson Calhoun. Mr. Lewis had been at Zamboanga with the Quartermaster's Department of the Army for several years, and was acquainted with many Moros.

Mr. Wax was a sergeant in the Army, had been in the Lanao region for some time, and was recommended by Major Bullard as a good man to take the Lanao people to St. Louis. Mr. Calhoun was a school-teacher at Davao and knew many of the Bagobo people who live along the shore of the gulf. Authority was later given to arrange also for a party of Sulu Moro, and Mr. Thomas W. Coverston, postmaster at Malabang, was engaged to take charge of this party. He had lived a year or more at Jolo, and understood the language of the people of the island. It was later, however, decided not to send the Sulu people to St. Louis. The material which Mr. Coverston had in the meantime bought was transferred by him to me, as acting chief of the survey, and later transferred by me to the clerk in charge of the exposition office. Mr. Coverston was thereupon relieved of his duties.

In making arrangements for these tribal exhibits at St. Louis, Doctor Jenks visited Zamboanga, Davao, Cottabato, Lanao, and Jolo. At Davao he visited the Guianga, a people closely related to the Bagobo in industries, dress, and mode of life. Very likely the two peoples are sections of the same tribe. There is a confused mass of tribes in Davao and vicinity, about which very little that is authentic is known. It will take months of study to learn the divisions, and relations to one another in culture and language, of these tribes, but such a study promises valuable results. From Malabang Doctor Jenks crossed Mindanao to Iligan, spending a little more than a week on the way. During this time he made arrangements for a party of Lanao Moros to go to St. Louis, besides learning a good deal about the Moros.

After the return of the chief of the survey to Manila his time was occupied largely in exposition business. On March 24 he sailed for the United States. He was directed to go to St. Louis, install the Philippine ethnologic exhibit, and later serve on a committee which is to determine what part of the Philippine exhibit shall be returned to the islands. The time when he is not engaged at the exposition in St. Louis is understood to be at his own disposal.

WORK OF THE ACTING CHIEF.

I came to the islands in March, 1903, to be connected with the Bureau of Non-Christian Tribes, as the survey was then called, but through a misunderstanding there was no vacant position to which I could be assigned. I was, therefore, connected with the exposition board until December 31. During this time I was working under the direction of the chief of the survey.

At the time the last annual report was submitted I was in Surigao. From this trip I returned in October. During the latter part of July, and in August and September, I visited the Mamanua of the Surigao Peninsula, especially those along the western shore, and also the Manobo and the Mandaya of the Agusan Valley as far south as Compostela in the river basin, and Bislig on the eastern coast of the island.

The Mamanua are Negritos, live in small rancherias, three, four, or five houses in a place, and find their food by hunting wild fruits in the mountains, spearing wild hogs, catching fish and snakes, and raising a few camotes. They wear few clothes, and live in rude shelters, which they abandon often and move to some other place where it may be easier to find food and to hide from strangers. They weave a little coarse cloth, make bows and arrows, and also a two-stringed guitar. The guitar is very likely an idea which they borrowed from the Manobo, with whom they are in contact on the south, and from whom they get by trade the long-handled, iron-pointed spears which they use in killing wild hogs. They are a timid little people, and will run away on the approach of a white man if there is enough time to escape. There are some hundreds, possibly a few thousand of them, in Surigao. It seems likely that a few years ago they were more numerous than at present. I saw a number of rancherias occupied by some 12 or 15 people, where I was told there lived formerly 40 or 50.

Cholera is, in part, at least, responsible for this decrease. It is entirely possible to visit the Mamanua if one has time to do the necessary hunting for their rancherias, and has a guide in whom they have confidence, and who can prevent them from running away at the approach of strangers. So far as my observation goes, the Mamanua do not live in Surigao farther south than the town of Tubay, at the mouth of the Tubay River. It is possible, however, that there are other settlements of them in the mountains farther south, between the Agusan basin and the Pacific.

The Manobo and the Mandaya live in the basin of the Agusan, in the mountains which form the divide on either side of the basin, and on the outer slopes of the two divides. By far the larger part of the region which was, until recently, included in the province of Surigao, is occupied by these two tribes, in so far as it is occupied at all. They are much alike in culture and general appearance. Some of the Mandaya appear to be of a lighter color than many of the people of the Philippines. Probably less than half of them have been Christianized and induced to live in towns. The remainder still live in rancherias or in isolated houses in parts of the mountains which are not easy of access. There is a good deal of intercourse between the pagan and the Christian sections of the two tribes, but they are not always on friendly terms. A man rarely, if ever,

leaves town without carrying a long-handled spear and a bolo. While passing along the trails they are constantly on the lookout for enemies, and on sighting a stranger immediately assume an attitude of defense or disappear at once into the bushes.

There is always one, and there are often several, Visaya families living in the Manobo and Mandaya settlements. These Visaya would like to see the mountain people brought down and made to live in towns. The apparent reason for this desire is that the larger the towns are the better the trade is, and the more chance for the Visaya people to make money. They would like even to have constabulary stationed in a few towns, ostensibly to protect the people, but really, I suspect, to keep them from abandoning the town and living again in the hills. And yet the Manobo chiefs of Moncayo asked if they should not have a guard to protect them from their enemies, and said that they could not continue to live in town if their enemies were allowed continually to make attacks on them.

Many of the houses occupied by these people are built high up from the ground, giving the appearance of houses set on stilts. The highest which I saw was between 20 and 25 feet above ground, and built on a clump of bamboo. The bamboos had been cut off at the proper height and the floor built on them. The most common means of access to their houses is a single notched log. Up and down these logs the people, even the children, pass easily and quickly. It is not so easy for one who wears shoes, as the log is not a large one, and therefore the notches are not deep. As the danger of attack from the pagan people become less, the practice of building these high houses is passing away. In the time between two visits, two months apart, which I made to this region, a number of the most notable high houses of the town had been abandoned and newer ones built nearer the ground.

A good quality of abacá is produced in the Agusan Valley, and some beeswax is gathered and shipped down the river, but almost nothing is produced compared with what the valley might yield. The population is, however, scattered, and the country almost entirely covered with forest. There are few trails and no roads, but the necessity for them is lessened by the numerous streams, which make communication easy.

I had been advised by the officer in command of the scouts stationed in Surigao to take with me a guard of 10 men. I followed his advice, but sent 5 of them back from Talacogan, a town about 60 miles from the mouth of the Agusan River. During the entire time I was in the river basin, and on my way to Bislig, the people seemed friendly.

Again, in November, I went to Surigao, ascended the Agusan River, and from Compostela went to the Gulf of Davao, passing through an almost unoccupied country over a trail but little used, and arriving at the mouth of the river Hijo in five days. This time I had with me 4 constabulary from Surigao. The few people whom I saw and the three settlements which I passed through had evidently seen very few white people. One settlement with about 40 people was built on a high point, from which it was possible to see the trail in both directions. This little place, known as Amang, was situated near the top of the divide between the Agusan and the Hijo rivers. As soon as I with my small party came in sight there was great

excitement among the people on the hill, and in a few minutes the entire place was abandoned, excepting by two men, one of whom I kept as a guide for the next day. I did my best, by calling to them across the creek and assuring them of our kindly intentions, to induce them to return, but failed. By the time morning came nothing was to be seen or heard of them. One day later, after I had reached the Hijo River, all my carriers but one escaped. Then the constabulary, with the help of the one man who had not run away, built a bamboo raft, and on this we reached the mouth of the river. This region is practically uninhabited, but I saw a few fishermen along the river and one settlement, apparently abandoned. A few hours before reaching the mouth of the river I came to a number of houses occupied by Moros. From the mouth of the river it is possible to reach the town of Davao in a native boat in a day or less, unless the winds and the currents are contrary.

Since my return from Mindanao I have been occupied in preparing manuscripts for the press and in the routine work of the office.

WORK OF MR. REED.

On September 6 Mr. Reed returned from a six weeks' trip in Negros, where he had been sent to appoint enumerators for the census of the non-Christian tribes in that district, and to make a hasty survey of those tribes. He then devoted himself to work on his paper, "Negritos of Zambales." An outline of this paper was given in a former report of the chief of the survey. In February it became necessary to send some one to Mindanao to confer with the men in charge of parties from the various tribes who were going to St. Louis, and to furnish them with money. Mr. Reed was, therefore, sent to Zamboanga, where he remained about two weeks. On March 15 he was appointed governor of the province of Lepanto-Bontoc, a vacancy having been occasioned by the departure of Mr. William Dinwiddie to China. April 1 he left Manila for Cervantes. The vacancy thus created was not filled until June 1.

WORK OF MR. CHRISTIE.

On June 1 Mr. Christie was appointed ethnologist in the position made vacant by the resignation of Mr. Reed; the designation of the position having been changed from clerk, class 7, to ethnologist, class 7. Mr. Christie has paid especial attention to the study of languages, and it is expected that he will be able to do valuable work on the native languages of the islands. Since his appointment he has been translating and editing a series of papers on northern Luzon; all of these are to be published in Spanish, and a part of them in English. He has also been working on other publications of the survey, which are now coming through the press.

WORK OF PUBLICATION.

Up to the present time the survey has published nothing showing the results of its work. There are, however, a number of papers which will be completed in a few weeks and a number of others which will be sent to the printer soon. The papers in press and in preparation are as follows:

Volume I. The Bontoc Igorot, by Albert Ernest Jenks.

The publication of this volume has been delayed by the absence of

Doctor Jenks in the United States; all the proofs have been sent to him and some of them should be received back within a few weeks. On the return of this proof work will be resumed on the paper and within a few months it will be ready for distribution. In the second annual report of the chief of the survey a notice appeared of this paper.

Volume II, Part I. Negritos of Zambales, by William Allan Reed.

A notice of this paper appeared in the second annual report of the chief of the survey. The page proof has been returned to the printer and the paper will be ready within a few weeks.

Volume II, Part II. Notes on the Nabaloi Dialect of Benguet.

The survey has had in its possession for some time a brief grammar in manuscript of the Nabaloi dialect, spoken by the Ibaloi of Benguet, together with a vocabulary gathered from the same people. Both of these manuscripts are the work of Mr. Otto Scheerer, who lived some time in Benguet and knew the language of the people. The vocabulary, in addition to the list of words, contained a considerable amount of grammatical material. I, therefore, put together the two papers to form a single paper which was sent to Mr. Scheerer in Japan. He has just returned this paper after making various additions, corrections, and improvements. It will be sent to the printer within a few days. The difficulty of understanding words as pronounced by a primitive people, and the further difficulty of recording them accurately can be easily understood. The same words are frequently pronounced differently by different people, and they vary from year to year for lack of a recorded standard. In spite of these difficulties which are common to the study of primitive languages, Mr. Sheerer has brought together a good vocabulary and has made a careful study of grammatical rules and verbal forms. The paper will furnish a useful example of work which we hope to do among many tribes of the islands.

Together with this paper there will be included in the second part of Volume II a report on the "Batak of Paragua," by Lieut. E. Y. Miller, governor of Paragua. It will be supplemented by other information about this tribe drawn from two sources: One, a pamphlet published by the division of military information, Philippines division, translations of articles on the tribes of Paragua; the other, an article in manuscript sent to the survey by the division of military information.

The report by Lieutenant Miller is accompanied by some interesting photographs of the Batak made by him which are believed to be the first ever made of the people of this tribe. The Batak have, among other distinguishing characters, the bushy hair which is to be noted among the Negritos of Zambales, the Mamanua of Surigao, and other Negritos elsewhere in the Philippines.

Volume III. Augustinian Relations of Northern Luzon.

This volume will appear first in Spanish; later the most interesting and important parts will be published in English. These parts have already been translated. The "relations" consist of a series of papers written at various times during the last two hundred years by Augustinian missionaries throughout northern Luzon. They deal

largely with mission matters, their foundation and progress, the difficulties met and success attained; but incidentally they furnish a good deal of information about the customs and beliefs of the people. Because of the fact that the "relations" have scientific value, it was deemed wise to publish them.

Volume IV, Part I. History and Laws of the Moros.

Early in the year 1903, 33 manuscripts, in part original and in part copies, were purchased from Dr. N. M. Saleeby, now superintendent of schools for the Moro Province. These manuscripts deal with the history and laws of the Magindanao and Sulu Moros. By the terms of the sale, Doctor Saleeby was to translate the manuscripts. Fifteen of these were translated and were in the office of the survey until recently, when I again sent them to Doctor Saleeby with an outline scheme for publication and a request that he select certain pages of original text for half-tone reproduction. The original manuscripts as well as the copies are written in Arabic characters, and, as there is no Arabic type to be had in Manila, it seems unwise to delay longer the publication of the papers in order to print them in Arabic characters as well as in English, especially since the Arabic text would be useful only to scholars. It was thought best to include with these translations a brief account of the Moro tribes, their relations, their languages, and the territory which they occupy. Doctor Saleeby is at present at work upon this sketch. Upon the return of the first 15 manuscripts, this first part of Volume IV will be put at once in the printer's hands.

A knowledge of Moro law and custom and ideas such as these translations will give will be most useful in dealing with the Moro tribes and ought to be of assistance in avoiding troubles which are likely to arise from failure to understand a primitive people. This publication is one of the most important which we have in hand at the present time. Later the remaining manuscripts purchased from Doctor Saleeby will be translated and published in a similar way.

We are considering also the publication of a paper written by Doctor Saleeby on a System of Transliteration for the Philippine Islands, or the Filipin Alfabet. This paper, if published, will suggest a tentative scheme for recording various languages of the islands, even though it may not be possible to adopt it in all its details. It is thought that its publication may enable us to arrive at some uniform plan for writing the native languages. At the present time it is not easy to be sure just how to write a word and after it has been written to know that one reading it will understand the sound which it was desired to convey.

THE MUSEUM OF ETHNOLOGY.

With the exception of a few articles, the exhibits of the museum have been sent to St. Louis. This material will be either disposed of in the United States or returned to Manila as may be decided at the close of the exposition. We have in the Oriente building one large room and a hall in which we can install a small exhibit. If, however, any considerable quantity of ethnologic material is returned from St. Louis most of it will have to be stored until some further provision for space can be made. It is, of course, to be hoped that before long a special building will be provided for a museum. The time is

especially favorable now for building up a museum of ethnology because the great museums of the United States and Europe have not yet begun to make collections from the islands. When these museums have once begun collecting, the prices of many things will rise and it will be increasingly difficult to get them at any price.

THE COMMERCIAL MUSEUM.

The work of the commercial museum was interfered with from September, 1903, to December of the same year, by the necessary absence of Mr. Shiley in Zamboanga. Mr. Shiley was sent to Zamboanga to help in preparing for publication manuscripts which Doctor Saleeby has translated. After his return from Zamboanga, in December, he was engaged in collecting information and in answering the inquiries of correspondents, principally those in the United States.

Early in May the museum, together with all the offices of the survey, was moved into the Oriente building. Here the commercial museum has 3,882 square feet of floor space and 1,500 square feet of wall space. About two-thirds of the floor space is occupied by cases which were made in Japan for the exposition board and which are now filled with a Japanese exhibit. The remaining one-third of the floor space, and the wall space, are nearly all in use, but it is not possible to display all the exhibits now on hand for lack of cases to protect them.

The Japanese exhibit is made up of 3,475 individual exhibits furnished by a large number of exhibitors. There are also at the present time in the museum 113 other exhibits consisting of 1,382 articles, and furnished by 25 different exhibitors.

The limit of the possibilities of the space in the museum has been reached very nearly, so that any further requests for exhibits can not be made with the promise that they will be immediately displayed.

In addition to the correspondence above referred to, Mr. Shiley has written to officials in most of the provinces of the islands with the object of finding out what the chief industries and industrial opportunities of each province are, what agricultural implements are used, and what the prospect is of introducing modern implements and machinery. He also wrote letters relating to the museum and the privileges it offers to American manufacturers, to the Secretary of Commerce and Labor, Washington, D. C., and to the National Association of Manufacturers of America. These letters were published in the United States Consular Reports and in American Industries, the official publication of the National Association of Manufacturers, respectively.

As a result of these letters about 100 inquiries have been received from manufacturers and exporters about the lines of goods suitable for the Philippine Islands. Many of these inquiries are from manufacturers of farm machinery, tools, and household utensils.

It is believed that when adequate space has been provided the commercial museum will be able to promote trade relations between the United States and the islands to an extent that will show it to be one of the most important institutions of the islands.

THE NATURAL HISTORY MUSEUM.

The work done by Mr. McGregor and his assistants can not be properly dealt with here. The importance of this work is not generally understood. It is, of course, of great scientific interest, but it is more. A knowledge of biological conditions in the islands will enable us to meet serious problems that arise in agriculture, to render harmless insects and other pests. Comparison with the work of the biological bureaus in Washington is enough to substantiate this statement.

The following statement shows the results, so far as figures can, of Mr. McGregor's work during the year:

	Skins.
Expedition to Fuga and Calayan, August, 1903–January, 1904	1,098
Expedition to Anao, Tarlac Province, March, 1904	80
Expedition to Romblon Province, May–July, 1904	307
Collected about Manila and purchased in the market	259
Total	1,744

TRIBES AT ST. LOUIS.

A few words relative to the representatives of the Philippine tribes who were sent to the St. Louis exposition may not be out of place. At one extreme are the Negritos, the interesting little blacks who were probably the original inhabitants of the islands. They have often been described, so their general appearance is well known. They are probably at as low a stage of culture as any people in the islands. A representative group of men, women, and children was sent to St. Louis. Close to them in culture stands the Manguian of Mindoro. The short time available after a decision was reached to send Manguian to St. Louis made it impossible to induce any women and children to accompany the men. Five men only were sent. None of the 5 at all resemble the Negrito, but there are among the Manguian in Mindoro people whose closely curled hair, size, and general physical appearance suggest crossing with an earlier, even if now nonexistent, Negrito population of the island.

The Igorot from Bontoc are as good an example as the islands afford of the primitive mountain agriculturist of Luzon. There is probably none of the pagan population of the islands further advanced in general culture than they, and probably no people in the islands, pagan, Christian, or Mohammedan, as far advanced in agriculture. Contrary to the general idea, the term Moro covers not one people with common customs and a common language, but a number of tribes of Mindanao and the neighboring islands, who differ in customs and in language but have the common tie of the religion of Mohammed. These people are represented at St. Louis by two groups, one from the Lanao Moro in the vicinity of the lake of the same name, and the other from the district of Cottabato. Both are typical Moro groups. The sixth tribe represented at St. Louis is that of the Bagobo, one of the principal tribes of the province of Davao. From the point of view of dress they are the most interesting people in the islands of whom we have knowledge. Their clothes are decorated with beads, disks cut

from shells, and with patterns elaborately worked with cotton yarn. At some points their culture seems to touch that of the Mandaya, who live across the gulf of Davao from them.

The Christian people of the islands are represented by Visaya in the Visaya village and by the constabulary and scouts from the various Christian tribes. From all these representatives from the islands a good idea may be had of the degrees of culture which have been attained by the different tribes.

FUTURE WORK OF THE SURVEY.

It is expected that during the coming year one member of the survey will be in the field practically all the time and two during a considerable part of the year. An expedition is planned to explore the northeastern part of Luzon—the eastern slope of the mountain range east of the Cagayan Valley. This region has been little visited by white men and is almost unknown. The exploration will be made either northward from some point on the eastern coast or eastward from the Cagayan Valley. The difficulty anticipated is in carrying provisions. Little is known about the people of the region, though there are said to be Negritos there. Any unfriendliness on their part would probably be due to fear, and would increase the difficulty of travel merely by increasing the difficulty of getting food.

Another of the less known parts of the islands is Paragua. About this, and especially about the Batak, the small blacks of the interior, further information is desired. A third much talked of but little known province is that of Mindoro. The often-revived story of a white tribe in the island, while apparently fanciful, may have a basis of fact in the presence of an unusual number of Albinos or of white mestizos resulting from the possible presence of shipwrecked sailors on the island. A careful exploration of the island would settle this point. In certain parts of Mindoro preliminary explorations have been made. Other parts still remain to be visited. A third region on which we particularly want further information is Misamis and adjoining provinces. A member of the survey will probably be sent to gather data on the tribes there.

The survey has now accumulated a large amount of photographic material and manuscript data. It is planned to use a part of this in a small publication which will be a description of the ethnology of the islands. The attempt to write such a book at this time may seem premature, for in spite of the many years that the tribes of the Philippines have been under observation comparatively little that is detailed and accurate is known about them; but the work will be admittedly tentative in character and will serve to bring together into accessible form useful information about the tribes of the islands, their manners and customs, their subdivisions and relations one to another. The book will present the general principles of ethnology, with a sketch of the ethnology of Malaysia and Polynesia. This will be followed by an account of the people of the Philippines, tribe by tribe. The Negritos—the probable first inhabitants—will be taken up; then the pagan Malay tribes, and finally the great Christian Malay tribes. Careful study of the people of the Philippines, the determination of their relation one to another, and a knowledge of their lan-

guages will furnish an important contribution to the ethnology of the Pacific.

Nor is such work merely of scientific interest and value. An acquaintance with the non-Christian tribes, with their customs and ideas, would make it possible to govern them better and more easily than would otherwise be possible. Comparison is at once suggested with the work being done by the Bureau of Ethnology among the Indian population of the United States. There is no doubt that if careful ethnologic work had been undertaken and carried on among the Indians in the early days of the Republic many mistakes which have been made might have been avoided. It is, of course, too late to change all this now. Officially the Indians of the United States will soon be merged in the rest of the population. The important work of the Bureau of Ethnology continues. The results of its work are now of scientific value only, great as this is. The problem of dealing with the tribes in the Philippines is relatively much more important than was the problem of the Indians in America. Relative to the area occupied, and in all probability absolutely as well, there are now many more people in the Philippine Islands than there were in the present territory of the United States three hundred years ago.

There is not the slightest expectation that the number of white people in these islands will ever equal or even approach the number of the native inhabitants. In these respects the problem here differs from that which we had to solve in the United States, and from these facts, too, its relatively greater importance appears.

It seems like a plain proposition that the more you know about a given people, their language, ideas, and customs, the better you can get along with them if you are determined to get along with them in the simplest and most peaceable way. The civilized nations of to-day who come most in contact with primitive people have in part learned this lesson. We are learning it here as we never did learn it in the United States. Now that the greater part of the general work of exploration which needed first to be done is completed, the time of the members of the survey will be devoted to more careful and detailed work in those places which promise to throw most light on ethnologic problems or which for other reasons more imperatively demand investigation. It is confidently believed that the work of the survey will prove itself to be not merely scientifically valuable, but practically useful in the work of controlling and assisting in their progress the uncivilized people of the islands.

Very respectfully, MERTON L. MILLER,
Acting Chief.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

ANNUAL REPORT OF THE GOVERNOR OF THE MORO PROVINCE.

OFFICE OF THE GOVERNOR OF THE MORO PROVINCE,
Zamboanga, September 1, 1904.

SIR: The following annual report, covering the period from the organization of the Moro Province to August 31, 1904, is submitted in accordance with instructions embodied in Act No. 787 of the Philippine Commission, enacted June 1, 1903.

The Moro Province was organized in accordance with the above act and the undersigned detailed and appointed governor on July 25, 1903.

On the recommendation of the provincial governor, George T. Langhorne, captain, Eleventh Cavalry, aid-de-camp, was appointed provincial secretary, and Charles Keller, captain, Corps of Engineers, U. S. Army, was appointed provincial engineer, both on August 15, 1903.

Fred. A. Thompson was appointed provincial treasurer August 5, 1903; John E. Springer, provincial attorney, August 19, 1903, and Najeeb M. Saleeby, provincial superintendent of schools, September 2, 1903.

The first meeting of the legislative council of the Moro Province was held on September 2, 1903. The first act of the council was passed September 4, 1903.

The five districts of the province provided by Act No. 787 were duly organized, as follows:

DISTRICT OF ZAMBOANGA.

Governor.—John P. Finley, captain, Twenty-seventh Infantry, September 2, 1903.
Secretary.—John R. Proctor, jr., captain, Artillery Corps, October 1, 1903.
Treasurer.—Charles B. McGhee, September 8, 1903.

DISTRICT OF SULU.

Governor.—Hugh L. Scott, major, Fourteenth Cavalry, September 2, 1903.
Secretary.—Oscar J. Charles, captain, Seventeenth Infantry, September 2, 1903.
Treasurer.—Burdette A. Crumb, October 1, 1903.

DISTRICT OF LANAO.

Governor.—Robert L. Bullard, major, Twenty-eighth Infantry, November 11, 1903.
Major Bullard resigned June 30, 1904, on account of ill health, and Daniel B. Devore, captain, Twenty-third Infantry, was appointed to succeed him July 1, 1904.
Secretary.—A. P. Hayne, January 1, 1904.
Treasurer.—Loren L. Day, January 7, 1904.

DISTRICT OF COTTABATO.

Governor.—Carl Reichmann, captain, Seventeenth Infantry, September 9, 1903. Captain Reichmann resigned on March 31, 1904, to accept a detail as military attaché with the Russian army in Manchuria. Robert O. Van Horn, captain, Seventeenth Infantry, was appointed to succeed him April 1, 1904.
Secretary.—Frank J. Dunleavy, November 11, 1903.
Treasurer.—Stephen R. Beard, December 1, 1903.

DISTRICT OF DAVAO.

Governor.—Edward C. Bolton, first lieutenant, Seventeenth Infantry, October 23, 1903.
Secretary.—Thomas R. Henderson, October 23, 1903.
Treasurer.—G. W. C. Sharp, October 8, 1903.

The military officers mentioned above were assigned to duty in connection with civil affairs, and appointed by the provincial governor, as provided by Act No. 787.

The necessary clerical force has been supplied the governor's office, the offices of the members of the legislative council, and the various district offices, as required. All permanent appointments have been made in accordance with civil-service law.

Every effort has been made to conduct the government of the province in as economical a manner as possible.

The general conduct of provincial and district officials has been, with few exceptions, very satisfactory. The duties of municipal officials have with a few exceptions been indifferently performed.

The scope of the work attempted by the legislative council is embodied in its acts, which are hereunto appended. The mixed character of the population, the varying degree of intelligence, ranging from a few fairly well educated Filipinos on the seacoast to cannibalistic savages in the interior, the intense animosities due to religious differences, growing out of the struggle between Christians and Mohammedans covering several centuries, the entire absence in many sections of interior ways of communication, and the amount of time required to visit the seacoast and remote island settlements have all combined to render the problem of establishing government and exercising control over the mixed peoples of this province a very difficult one.

The element which has been most difficult to deal with has been the Moro. A number of peoples are included under this general head, all of them Mohammedan, all of them intolerant, and, as a rule, hating and despising Christians and living very largely by piracy, slave trading, and robbery of the weaker and less warlike savage races of the province. Spain was just completing her final preparations to finish the long-delayed conquest of the Moros of Lanao and Sulu when the Philippine Islands were sold to the United States, and upon the withdrawal of her forces from the Sulu, Cottabato, and Lake Lanao districts the Moros immediately assumed practical control of these sections, inaugurating an era of aggression and outrages of every description.

In the Cottabato Valley, under the leadership of Datos Ali and Djimbangan, they sacked the town of Cottabato, killing many of the principal inhabitants, stripping all the Christian women naked and marching them in this condition through the streets, and, after selecting those whom they wanted, finally distributed them among their friends and followers.

In the Lake Lanao region the withdrawal of the Spanish forces was signalized by repeated raids upon the Filipino settlements, resulting in the killing and enslaving of considerable numbers of Christian Filipinos.

In Sulu the town of Jolo would have been destroyed and its inhabitants massacred but for the protection of the United States forces.

These were the general conditions which existed at the time of our occupation of the Moro territory. In the Sulu Archipelago our occupancy was subject to the restrictions of an agreement known as the "Bates agreement" or treaty, under which the Moros became turbulent and insolent, and finally broke into open rebellion, attacking United States troops and attempting to take the town of Jolo by treachery. In the Cottabato Valley our attitude from the time of occupancy until the time of the organization of the Moro Province was largely passive, and little influence had been exercised upon the vicious practices of the Moros. No action was taken to punish the perpetrators of the outrages upon the inhabitants which have been above referred to. Conscientious attempts had been made to stop slave dealing, slave trading, and kindred vices, but it is not believed, in the light of subsequent events, that they were effective beyond the immediate vicinity of the town of Cottabato. In the lake region the attitude of the Moros was one of open and armed defiance, which necessitated several punitive expeditions, which were successfully made, inflicting severe punishment upon the Moros, but leaving them still, throughout the greater portion of the lake region, bitterly hostile, and in other portions quiet and professing friendship, but in reality ugly and seizing every opportunity to do harm to American soldiers and officers. The great island of Basilan, with from 20,000 to 30,000 Moros, was, thanks to the influence of Dato Pedro Cuevas, since deceased, friendly and peaceful. The attitude of the savage non-Christian peoples of the interior of Mindanao was one of timid friendliness. Most of these people are not warlike in character, and, even if they were, are so poorly armed as to be capable of giving very little trouble.

Such was the general condition of affairs at the time of the establishment of the provincial government of the Moro Province. Both the general commanding the division of the Philippines and the civil governor of the Philippine Islands had informed the provincial governor that, in their opinion, active punitive measures would have to be taken with the Moros in various sections, especially in Sulu.

With the organizations of the districts of Zamboanga, Sulu, Cottabato, Davao, and Lanao instructions were issued the different district governors to endeavor, by every means in their power, to gain the confidence of the natives, establish friendly relations, explain the purposes of the new government, and influence the people to discontinue slavery and other vicious practices. In some cases these measures met with marked success; in others, especially in Sulu, Cottabato, and Lanao, our forbearance and persuasive attitude was mistaken for timidity and lack of power, which later on led to conditions necessitating vigorous action on the part of the military authorities, which resulted in the complete destruction of the Moro power in these districts and brought to an end, it is believed, all organized resistance therein.

The organization of the districts was followed by the setting apart of certain municipal districts—Siassi, Cagayan de Sulu, Jolo, Zamboanga, Dapitan, Iligan, Malabang, Cottabato, Davao, Mati, Makar, Baganga, Caraga, and Cateel. It has been impracticable to completely organize some of these municipalities as yet, for want of suitable personnel to assume charge of affairs.

In order to meet the requirements of the native situation a number of tribal wards have been organized throughout the province. The purpose of these tribal wards has been to provide for the government and control of the Moro and other uncivilized peoples and to give them, under certain conditions, the option of continuing under a tribal or paternal form of government or becoming full citizens of a municipality. Details of the plan are set forth in Act No. 39 of the legislative council. The operation of the act has been satisfactory. It is believed that in time all well-to-do members of tribal wards will prefer to become full citizens of the municipalities. In the meantime the tribal ward system serves a very useful purpose and furnishes a means of controlling the uncivilized peoples for whom it is intended.

Slave trading has been brought practically to an end throughout the seacoast Moro districts, although undoubtedly it continues to some extent between the inland Moros and the savage tribes of the interior; but as they are unable to bring their victims to the seacoast for sale or barter, or to move them about without danger of capture and punishment, interest in this hitherto principal industry of the Moros has greatly diminished, and the timid and more or less defenseless natives of the interior are beginning to take heart.

There has been much said about the paternal form of Moro slavery. After something over a year of almost continuous contact with the Moros, under varying conditions of nominal friendliness and actual hostilities, and after visiting in detail all the principal Moro districts, it can be stated that it would be difficult to imagine a worse form of slavery. The slave had absolutely no rights. His wife, his daughters, and his property were entirely subject to the will of his owner, and he himself could be sold or even killed with impunity. There were, of course, many instances where relations between slaves and owners were friendly, but accidents of this kind should not be taken as a ground for describing an institution where the owners hold absolute power of life and death over their slaves as a beneficent, kindly, or paternal one.

No effort has been made to tear these former slaves from their masters, but they have all been informed that they are entirely free to remain with them or leave them, as they see fit. The result has been that many former slaves have left their masters and established themselves independently—a condition of affairs which is rapidly extending.

Slaves were acquired by purchase, by capture, by heredity, and through indebtedness, and the conditions resulting were most unfortunate, not only for the slaves, but also for the owners, as the institution seemed to paralyze all true development and to accentuate the various forms of vice to which the Moro is so commonly a victim.

Immediately upon the withdrawal of Spanish authority and control, both on land and sea, a condition of anarchy sprang up, which

in 1899 Sawyer, the historian of the Philippines, described as follows, speaking of Mindanao:

The present condition of the island is most lamentable. Nothing could be more dreadful; robbery, outrage, and murder are rampant. Every evil passion is let loose, and the labor of years has been lost. * * * In the words of one who knows the country well, "Mindanao has become a seething hell and is in a condition more dreadful than ever before in historic times."

While this description is probably somewhat overdrawn, yet that there was considerable foundation for it is shown by the following extracts, the first taken from this year's report of Governor Scott, of Sulu, describing conditions in Sulu at the time he assumed charge of the district, the others from reports of Colonel Sweet, commanding officer at Jolo, written a year after Mr. Sawyer's statements were made:

The condition of the common people was most deplorable; slavery was rife; for failure to pay a debt of $5 a man and his whole family could be taken into slavery for life; there were frequent cases of kidnaping, stealing, robbery, rape, and murder. The datos and other chiefs preyed upon the lower people. As they said, "The big fish in the sea were accustomed to swallow the little fish." No man had any incentive to work for anything beyond a mere hand-to-mouth living, for he was not allowed to enjoy the fruits of his labor, which were taken from him promptly by robbery or by unjust fines. The very first case investigated, before landing, was that of Panglima Ambutong, who complained that the Rajah Muda, the brother of the sultan and his heir apparent, and in charge while the sultan was absent in Singapore, had fined him 2,000 pesos and confiscated his bail for defending himself from Panglima Dammang, who had attacked him. A similar fine and confiscation had operated also against Dammang, both without a trial. These cases were rectified at once.

Piracy.—The natives of the islands are natural pirates, the multitude of small islands and reefs favoring them. These piracies are committed against each other or against Chinamen. When boats and their crews disappear, the natives take it as a matter of course; it is only another case of piracy. No reports of piracy against whites have been received, but from evidence found by Captain Cloman in the Selungan affairs it would appear that piracies against Sandakan traders have been committed recently.

* * * * * * *

Complaints are being received from Moros as to unjust treatment from the sultan, the datos, and others in authority, and when they complain to the sultan they are fined or can get no redress. I have investigated some of these complaints for my own information and find that justice as we understand it is unknown. The desire to get money overrides all other considerations. As an example of justice: A Moro lost a carabao by theft; he located the thief and complained to the sultan, who fined the thief $105 and confiscated the carabao.

The political situation remains the same as at last report. The lower classes have more confidence in us, but the sultan and the chiefs are obstructive factors in all our efforts for the betterment of the condition of the Moro people. They have no honest desire for American methods of honest administration, when the whole people will be benefited, unless there is some consideration in it for them. They are as overbearing toward their people as ever, and do not seem inclined to change their arbitrary methods or aid the people to better themselves. They act as if they thought the people were created to be their slaves or for their own aggrandizement. The lower class seem to be peaceable and as law-abiding as they can be under the circumstances. Stealing is very prevalent and will continue so until the chiefs resort to different methods of punishment; fining and selling into slavery are practically the only punishments awarded for any offense, and, as the fines are divided between the sultan and datos and judge, they are naturally large for small offenses and comparatively small for the worst offenders. The result is a person has to steal in order to pay his fine or he will be sold as a slave.

These extracts would have applied with equal force to conditions existing in the Cotabato Valley and in the Lake Lanao region.

All the district governors have displayed ability and energy in dealing with the situations confronting them. Most of them have been very tactful. As above indicated, the situations of greatest difficulty have been those where the Moro predominated. The results, on the whole, have been everywhere satisfactory, and as much progress has been made as could reasonably be expected in the comparatively short time that has elapsed since the organization of the districts.

One very important feature of the provincial organization, especially in its bearing upon the control of the Moro and non-Christian element, is still undetermined upon, namely, the establishment of courts for the trial of cases between Moros, between non-Christians, and between Moros and other non-Christians. It was believed at the time of the organization of the province, from the information then at hand, that a sufficient body of laws existed, especially among the Moros, and even among some of the other non-Christian peoples, to serve as a basis for their control, and it was the desire of the Philippine Commission that the legislative council gather, modify, and codify the laws of these peoples, and where not inconsistent with humane and decent ideas to put them in force; but after a year of diligent investigation and study of this question it has been found that the Moros and other savage peoples have no laws—simply a few customs, which are nowhere general, varying from one valley to the next, from one island to another. Such laws as they have are many of them revolting and practically all of them utterly and absolutely undesirable from every standpoint of decency and good government. The Moros are, in a way, religious and moral degenerates. They profess Mohammedanism, but practice only those precepts of the Koran which suit their individual cases. They have no written laws worthy of the name. Evidently the first Mohammedan priests brought with them to these islands the teachings of the Koran in more or less purity, and also certain of the Mohammedan laws, but since that time, so far as can be gathered from the traditions of these people, they have gradually fallen away from the religious teachings, and most of the laws which are founded on the Koran have fallen into disuse and been forgotten, so that at the present time there is little or nothing left of them. Those that are left relate principally to the plurality of wives, the control and protection of their concubines, and laws regulating property in slaves. In short, nothing has been found worthy of codification or imitation, and little or nothing which does not exist in better form wherever humane, decent, and civilized laws are in force.

With all their faults the Moros are brave and resolute, and under good laws and an honest government will in time give a good account of themselves.

At the date of writing this report conditions throughout the province are peaceful, with the single exception of the presence of an outlaw in the upper Cotabato Valley—Dato Ali, of Kudarangan. This Moro (Ali) flatly refused to obey the antislavery law and attempted to raise the whole Cotabato Valley in revolt. Details of operations against him have already been covered by special reports. His fortification was taken and destroyed in March and his following

dispersed. It is believed that his main work was the largest ever constructed by a Moro in these islands. It was larger than 20 of the largest cottas of the lake region of Sulu, and would have easily held a garrison of 4,000 or 5,000 men. It was well located, well built, well armed, and amply supplied with ammunition. There were embrasures for 120 pieces of artillery. Eighty-five pieces were captured, among them many large cannon of from 3 to 5½ inches caliber. The other pieces in the work, small lantakas, were carried off or thrown into the river. Ali is at present at large with an armed following of 50 or 60 men, and a miscellaneous following of a hundred or two people, who accompany him under compulsion from place to place, carrying food, etc., and whose personnel is frequently changed. As the hereditary dato of the upper valley the people at heart sympathize with him, but not to the extent of openly taking up arms in large numbers.

Reconnoissance parties have been sent all over the province, and have attempted by kindness and tact to open up friendly relations with the wild peoples of the interior, and in this respect have been in many instances successful. In the district of Davao especially good work has been done among the wild tribes by Governor Bolton and Mr. Orville Wood, an American school-teacher of the district. A large number of Bogobos have been induced to settle on the coast at Santa Cruz, and under Mr. Wood's direction and guidance have built a fine village with a population of about 800 souls. The children have taken up school work with great enthusiasm and interest. Many of them speak English and some write it. The adults are industrious and docile and show many amiable traits. Now and then a few go back to the hills to take part in some religious ceremony, with its accompaniment of human sacrifice and sometimes cannibalism, but these instances are few and will soon cease altogether. At present they serve to illu-trate the chasm which is being bridged over between savagery and the conditions of village life, with its attempts at schools and government. It can hardly be expected that these savage people, however good their intentions, however great their desire to improve, can pass entirely from one extreme to the other in the short time which has elapsed between their past condition and present surroundings.

In speaking of the settlement at Santa Cruz it is only just to state that this settlement was originaly established by a Jesuit father prior to the late Philippine revolution. During the troubled times which followed it was abandoned, but with the reestablishment of peace some of the original settlers returned and formed the nucleus of this now prosperous and growing native community.

It is believed to be the best policy, and the work of the legislative council is carried on with the conviction that the principal object of its work should be to gradually bring the various and diverse elements of this province under a similar form of control, approximating and finally attaining the method of control exercised among the civilized peoples of the Philippine Islands. In some sections it will be a long time before this object is attained. This policy, however, if consistently followed, will gradually accustom the diverse elements of which the provincial population is composed to the laws and principles in force in the Philippine Islands. In awarding punishments to savage peoples justice must be tempered by consideration for their condition

of intelligence and their tribal customs. This is believed to be the best policy, and after careful consideration it is not thought advisable to attempt to codify and put in force, under the name of laws, the customs which have hitherto obtained among these people, as many of them are revolting and but few embody principles which we would wish to perpetuate. In brief, the codification would be a farce. It would amount to the writing of a new law, which must necessarily be based upon the laws and practices with which we are familiar. In other words, it would result in a complete change of existing tribal customs and so-called laws. Such being the case, it is better to at once adopt in a general way the laws in force in other portions of the Philippines and bring all the people of these islands under a common system of justice.

There is nothing to be gained by the codification of the Moro laws, and the outcome will necessarily be confusion. The line between the Filipino of this province, amenable to the general laws of the Philippine Islands, and the Moros and non-Christian inhabitants of the interior is a very indistinct one, as in many cases they are mingled, living in the same villages and rural communities. The object of legislation in the way of lawmaking should be that one general system of law apply to all the people of the Philippines, that its application be tempered to the condition of the ignorant savage, but, although tempered, the general principles of the application of justice should be the same.

With the possible exception of the system of tribal ward government, it is believed that the same general principle of uniformity may be applied in reference to harmonizing the form of provincial government existing in this province with that existing in others. It is believed that, after the few years necessary to bring order out of the chaos existing among the savage peoples, this should conform to the accepted type of provincial government existing throughout the Philippine Islands.

PROVINCIAL INCOMES.

Under the act of organization the province is awarded the customs collections of the ports within the province, the internal-revenue tax, and the forestry tax, together with the usual municipal and other local forms of taxation. The total general provincial revenue for the year ending June 30, 1904, was ₱337,378.05. The amount on hand June 30, unencumbered and free for appropriation, was ₱136,834.59. The amount appropriated but not expended was ₱26,181.76.

From this is to be deducted the cost of customs throughout the province; statement not yet rendered by the auditor, but amount is reported to be ₱53,170.62, leaving a total of ₱83,663.97 free for appropriation above all expenditures and outstanding indebtedness. Amounts received from customs collections, ₱222,664.39; cost of customs collections, ₱53,170.62, or a total of over 23.8 per cent of the customs revenue. It is believed that the cost of collections is unduly high and that it should be reduced during the coming year.

The expenditure of funds is accounted for as follows:

Government of Moro Province, 18.4 per cent of all revenues, divided as follows:

	Per cent.
Governor's office	1.5
Secretary's office	3.4
Treasurer's office	3.9
Attorney's office	2.8
Engineer's office	3.3
Superintendent of schools' office	3.5

These figures do not represent exactly the expenses of the various offices. For instance, clerks and stenographers are furnished from the secretary's office to the offices of the other members of the legislative council, and two Arabs, at ₱1,800 per year, classed as school teachers, are employed in translation and other work in the office of the superintendent of schools—work not altogether pertaining to this department, but involving in many instances translations into Moro of orders and proclamations. The engineer's office is charged with a number of employees who really serve in all the offices of the legislative council as caretakers, messengers, etc. The statement as given is sufficiently accurate for general purposes: District governments, 13.5 per cent; schools, 13.5 per cent; public works, 6.5 per cent; customs expenses, 16.1 per cent of the total revenue.

The expenses of the general government and the district governments have been necessarily heavy, as the organization of the government has called for the equipment of the various offices, the purchase of all kinds of supplies, and general expenses incident to organization. Considerable time was required in reorganizing the school department, which was not in full operation until the last six months of the year. The same may be said of the department of public works. A considerable amount of work has been accomplished in the way of preparation of plans and estimates for public works which are now under way.

All sums of money mentioned in this report are in Philippine currency.

It will be seen that the total fund available for provincial expenses has, in view of the work in hand, been a comparatively small one, and the strictest economy has been necessary in order to maintain the government in a reasonably efficient form and avoid getting into debt.

A large portion—probably three-fifths—of the dutiable articles consumed in the province are imported through the port of Manila and distributed from there to merchants in this province. This loss of revenue is in part compensated for by the general insular government maintaining the constabulary force serving within the limits of the province, post-office department, and courts of first instance.

It is hoped that by the establishment of better communications with foreign ports, through arrangements with ocean steamship lines now passing through the Straits of Basilan en route from Australia to Hongkong and other Asiatic ports, the merchants of this province may be able to import directly. If this can be accomplished there will be a very material gain in the provincial income, as well as the establishment of far more healthy business conditions.

It is believed that the total provincial revenue for the coming year will considerably exceed the revenue of the past year, but it is difficult to estimate even approximately what the increase will be. The extensive loss of carabao, horses, and cattle has very largely crippled the agriculturists and limited industry in many directions.

Cedula taxes have been paid this year by the Moros for the first time in their history. In the Cottabato district alone over 7,000 Moros have taken out cedulas. The number taken out in the Lanao and Sulu districts has been inconsiderable, owing to the active and determined character of the opposition in these districts to the establishment of government and control, which has continued until recently. Now that resistance in these places has practically been ended, it is believed that the inhabitants will comply with the obligations imposed upon them.

The cedula tax collected among the non-Christian peoples is devoted to improvements in the tribal ward districts in which collected and in the maintenance of such petty government offices as are required in the administration of the headmen's districts and tribal wards. It is believed that this system will be much appreciated by the Moros as soon as they thoroughly understand it. Under the dato system taxation was arbitrary and fixed by the dato, petty sultan, or other native ruler, who took from their subordinates whatever they wanted, and taxes (forced contributions) were generally in accordance with the industry and accumulations of the person taxed, a system which naturally tended to discourage production and limit very much the industry of the people. Under the present system of small taxes, devoted almost exclusively to the needs of the tribal ward and the maintenance of the headmen's government, a system of uniform moderate taxation is substituted for a system of taxation regulated only by the avarice of the taxor and the capacity to pay of the person taxed.

A certain amount of revenue has also been derived from the licensing of arms. This also is an entirely new departure for the Moros, and for the first time in their history they are licensing their arms. This action and the payment of the cedula tax are excellent signs and augur well for future good conduct.

Many Moro boats have taken out coastwise and foreign trading permits and have been licensed and registered.

Incomes from cedula taxes, licenses for bearing arms, and licenses for trading boats will probably increase, as well as income from land taxes, and, it is hoped, from forestry and other taxes.

It is proposed to devote 25 per cent of the total revenue to public education and an equal amount for public works. The balance will be consumed in aid to municipalities, maintenance of the government, charities, administration of justice, and incidental expenses.

Considering the fact that the province started with an empty treasury and under conditions which were rather discouraging, and that the expense of organization of the provincial and district governments has been met, the surplus revenue remaining from the first year's work is satisfactory.

SCHOOL SYSTEM.

A strong effort has been made to establish as good a school system as the funds available would permit. During the year 52 public schools were in operation in the province. Fifteen American teachers were on duty, with salaries of approximately ₱200 each per month. The salaries of native teachers actually engaged in teaching run from ₱180 per annum to ₱600 per annum. Fifty-nine native

teachers were employed, of whom 9 are Mohammedans and the rest native Christians. Forty-nine public school buildings are occupied, 29 public buildings and 12 rented. Total enrollment, 2,114 children; average attendance, 1,582; Moro children in attendance in schools, 240. It is thought that this number will rapidly increase during the coming year, as Moro parents are much less suspicious than formerly, and are commencing to send their children to school. So far as the Moros are concerned, this is perhaps one of the most promising indications of a change for the better. Recently quite a number of requests for schools have been made by Moros to the governor of the province. In most instances the Moro making the request has guaranteed to supply a school building.

Most of the provincial schools are necessarily rather crude affairs, as everything had to be started from the bottom, schoolhouses built or repaired in most places, and children induced to come to school. Both the Moro and Filipino children are anxious to learn English, and it is made the principal study in all of our schools wherever it is possible to obtain teachers who have a sufficient knowledge of the language to instruct in it. The comparatively large salaries paid American teachers under the civil-service rules make it impossible to maintain as large a number of this class of teachers as is required. It is very desirable to procure quite a number of English-speaking teachers for a smaller monthly salary. This would enable us to rapidly extend the teaching of English, a most important feature of public education; but, unfortunately, under present rulings and with the present income, this seems impossible.

There are many dialects in the island of Mindanao. Very poor Spanish is spoken by many of the Filipino natives, but Spanish has in no sense of the word taken so deep a hold as to have become the language of the people; consequently, there is every reason to believe that the development of English will be rapid and general. There is no object whatever in attempting to preserve the native dialects, as they are crude, devoid of literature, and limited in range. The Moro dialects have been used as a medium for translating the Koran and the recording of such rudimentary laws and regulations as remain from the old Mohammedan teaching and laws. There is little or nothing of a historical character which has been made of record, and absolutely nothing in the way of literature. The language is limited and crude and is not believed to present any features of value or interest other than as a type of savage tongue. It will probably be necessary in some instances to give a certain amount of instruction in Moro for a time, in order that the children being instructed in public schools in the pure Moro districts may be able to use and understand their own language in such affairs of life as render its use necessary. The teaching of English, however, should be pushed forward as rapidly as possible. We can not expect to continue the many different dialects of the island, and any attempt to do so would be unwise, but we can hope with a reasonable degree of assurance to make English the main language and the medium of transacting all official and most business affairs in the comparatively near future.

Efforts are being made to improve the methods of the native teachers and educate youth for teachers by means of a normal or secondary school. Much can also be accomplished by having all native

teachers attend school under the tutelage of American teachers for a certain portion of their vacation, the instruction to be principally devoted to improving them in teaching methods and qualifying them for work in higher grades.

With the exception of the secondary school at Zamboanga, the schools are principally of a primary grade. In some of the schools pupils are graded somewhat in advance of the primary schools, but such classes are few.

Plans are under consideration to assemble in Zamboanga from 200 to 300 native children, gathered from all portions of the province; the children to be carefully selected and to be from 10 to 14 years of age; for the purpose of putting them at school under first-class supervision and giving them a course of about six years, which will include primary school, manual training, and, for those who show capacity, normal training; the children to be returned to their homes for vacation at regular intervals. If this can be carried out, and it is believed it can, it will give the province a large number of well-trained natives as assistants in the various departments of the government and especially as teachers among their own people.

The policy of the province is to build and own its own school buildings and conduct its own school system, independent of municipal influence or control. Arrangements are being made to purchase a desirable piece of property in Zamboanga on which to erect a suitable secondary school building, as well as a first-class building for common schools.

The work of the first school year, while leaving much to be desired, has been reasonably satisfactory and gives reason for hope of a successful future. The schools in the town of Zamboanga have been particularly successful and, everything considered, are really excellent. It would be a long time before the dense mass of absolutely uncivilized natives in the interior of this province and the provinces of Surigao and Misamis can be reached by a school system, but there is no excuse for failure to supply in the immediate future the present Christian inhabitants and the semicivilized people within our reach with a reasonable number of public schools, and to insist on the attendance of the children to the limit of the capacity of the schools.

PUBLIC WORKS.

The public works of the province have been very limited in extent and not entirely satisfactory in character. This has been largely due to the fact that the department has been undergoing organization and there has been little opportunity for systematic work. But the point has now been reached where such work can be taken up. The general policy has been to open up road and trail communication where conditions demanded, to construct the necessary provincial, district, and school buildings, repair the wharves, and do such other necessary work as is required to facilitate the transaction of public business, commerce, and agriculture. As the provincial buildings, roads, etc., have been practically without repair or improvement since the withdrawal of the Spanish authorities, and the amount of public moneys available during the past year has been small, the provincial resources have been severely taxed to meet the demands made upon them. The province is at present engaged in reconstruct-

ing the provincial building at Zamboanga, as well as the streets of the town, building a provincial jail, repairing wharves, constructing schoolhouses, and repairing district and municipal buildings at the principal towns of the province. Arrangements have been made for the purchase of road-building machinery in the way of traction engines, stone crushers, etc., and it is hoped that the coming year will see a marked improvement in roads, especially in the district of Zamboanga and the road from Iligan to Lake Lanao, for the reconstruction of which, together with work on other provincial roads, the insular government has appropriated, from the Congressional relief fund of $3,000,000 United States currency, the sum of $150,000 United States currency.

The extensive epidemic of surra, glanders, and rinderpest has practically destroyed the working animals of the province, and it is extremely difficult to secure draft animals for public works except at excessively high figures.

In this province, as in all tropical countries, money spent in the construction of temporary roads is money thrown away, and whatever road work is done must be of a substantial and lasting character. It is the purpose of the province to establish a fixed policy in regard to roads, calling for roads of permanent construction, bridge and culvert work of masonry, to the greatest extent possible, and for the planting of suitable shade trees along the sides of the present roads, as well as such new roads as may be constructed, and to inaugurate the "caminero" system upon all roads. In the sparsely settled districts, where pack transportation alone is used, it is the policy to construct trails, following to as great an extent as possible lines which will render them convertible into roads when traffic shall warrant such change.

There has been a very considerable amount of road work done by the Spanish Government, especially throughout the town of Zamboanga and neighboring section, also in and about Jolo and Cottabato, and a small amount at Iligan, but most of this work has fallen into a bad condition and requires extensive repair. Until the revenues of the province are very much improved the amount of road construction must necessarily be very limited and confined to the vicinity of the principal towns.

Water systems and extensive municipal public works are required at Zamboanga, Cottabato, and Iligan, but funds for them are largely wanting, and the work can only be undertaken gradually.

ADMINISTRATION OF JUSTICE.

Administration of justice has been effected, so far as the Christian element is concerned, through courts of first instance and justice of the peace courts, of the same type as those existing in other provinces. These courts have also had jurisdiction over all cases arising between Filipinos and Moros and Filipinos and other non-Christians, as well as cases between Americans, Europeans, and the subjects of Asiatic powers on the one part and Moros or other non-Christians on the other. Cases arising between Moro and Moro, between non-Christians, or between Moros and other non-Christians have been dealt with by the tribal laws and customs above referred to, but a continuance of this double system constitutes a great injustice, for under the present

law if a Moro kills a Filipino or Christian of a degree of intelligence and social condition in every way approximating his own—perhaps a neighbor living under exactly the same conditions—he receives the penalties prescribed by the criminal code in force in the Philippine Islands. If he kills another Moro or non-Christian under exactly the same conditions, the maximum penalty which can be awarded him under the Moro or non-Christian laws (customs) is a fine of 105 pesos. It is evident that a continuance or an elaboration of this condition is undesirable from every standpoint. The same general principles of law and the same general class of punishment should apply to all guilty of similar crimes. In the case of the ignorant savage the application of the law should be tempered with that degree of consideration and clemency to which his condition of ignorance and savagery is entitled. There should be but one system of law in force by organized civil government in the Philippine Islands, and the judges who are appointed to administer it among the non-Christian and savage races should be men of sufficient intelligence and judgment to apply it justly and reasonably.

The draft of an act organizing the district courts, prescribing the procedure, etc., for dealing with cases arising among the savage and non-Christian peoples, is now in course of preparation.

The antislavery law, prohibiting the forcible holding and trafficking in slaves, is working well, and its beneficial effects are everywhere noticeable in the diminished amount of slave dealing and slave hunting. All former slaves know that they can not be compelled to remain with their former masters and that they have a right to their own property and their own labor, and everywhere they are asserting their rights and demanding protection against the exactions of the datos and other petty rulers. Another year will see a very decided change for the better so far as the condition of the former slaves and the downtrodden "taos," or laboring people, of the various tribes is concerned.

The control and authorty given the headmen of the various tribal wards established under section 5 of Act 39 of the legislative council is being made good use of by most of them for the purpose of maintaining law and order and carrying out district laws and regulations. Once the district courts are established and in operation it is believed that our means of controlling these non-Christian people and of administering justice among them will be ample and satisfactory and that the disorders and abuses which have existed from past times will progressively diminish.

The good effects of the missions established by the Jesuits along the seacoast and at many places in the interior of this island are everywhere apparent, and the work which this society has done has implanted in many remote parts of the island not only the principles of the Christian religion, but the principles of law and order and respect for authority. There has been no attempt to interfere in any way with the Mohammedan marriage laws.

The secretary's office has been organized upon an excellent basis, and the work has been very efficiently performed. Attached hereunto is a report submitted by the secretary, covering a trip made to Sarawak, Java, and the Federated Malay States. Attention is invited to this report.

DISTRICT AFFAIRS.

DISTRICT OF ZAMBOANGA.

In the district of Zamboanga the governor and secretary have done careful and conscientious work in organizing the district, restoring law and order, and bettering the condition of the people. The entire district is peaceful. Dato Rajah Muda Mandi, an intelligent Moro of mixed Spanish and Moro descent, has been appointed headman of the district, with various deputy headmen representing the different tribes and factions as his assistants. Dato Mandi's position has been a difficult one, for his duties as headman of the district and representative of the government have in many instances brought him into conflict with customary practices of his own people, such as slavery, peonage, etc. Consistent support has been given him, and he has accomplished a very considerable amount of good work without apparently losing his hold on his own people.

The people of the district had, as a rule, good crops last year, and, aside from the losses due to surra and rinderpest, have improved their condition materially. A good deal of hemp and many cocoanut trees have been planted, and there is no evidence of actual want in the district. Ladronism has been entirely suppressed and the leader of the disorderly element, one Eduardo Alvarez, was killed while resisting arrest.

Efforts have been made to encourage the hill tribes to come to Zamboanga with their produce, and a native exchange has been erected where they can bring their products to market and where quarters have been provided for them and corrals for their animals in case it is necessary to remain several days.

The schools of the district have been well attended.

The conduct of the municipality of Zamboanga has been far from satisfactory, and it has been necessary to appoint a new municipal council, all of whom are natives. At present municipal affairs are progressing favorably. Expenses of the personnel have been materially reduced, and the district government is attempting to build up an interest in public improvements and establish the municipality upon a sound basis. The perpetrators of a number of murders and other serious offenses against the people and public order have been arrested and brought to trial and their cases disposed of, all of which has had a very good effect upon the peace of the district.

DISTRICT OF SULU.

The affairs of the district of Sulu have been handled with excellent judgment and much tact by the district governor, who has been ably seconded by the district secretary. The affairs of this district were, at the time of its organization, in a most unsatisfactory condition. The garrison was practically bottled up in Jolo. It was unsafe for small detachments to go far outside the walls, and troops moved in considerable numbers. There was no semblance of public order in the island, the sultan and his principal datos were at war with each other, disloyal to the government, and preying upon the poorer people. The abrogation of the Bates agreement has done much to facilitate the organization of local government and the restoration of

good order. Headmen have been appointed and are in most instances performing their duties in a satisfactory manner. There has been a very material increase in the output of hemp and other produce. At the time of writing this report peace and good order exist throughout the district, and the natives are obedient to the orders and instructions of the governor. Every proper effort is being made to control them as largely as possible through their principal men, who have been appointed to fill the offices of headmen in the various portions of the district.

DISTRICT OF COTTABATO.

The greater portion of the district has been orderly throughout the year. The upper portion of the Rio Grande Valley has been considerably disturbed since March, 1904, by Ali's outbreak. The crops last year and this year have been among the largest ever known in the valley. The condition on the whole is, from a Moro standpoint, one of prosperity. As soon as the disturbance caused by Ali is brought to an end it is believed that the upper valley will make rapid progress. The territory of the district has been divided among different headmen, who are performing their duties as well as can be expected under the circumstances. The municipal government of Cottabato has required careful supervision to secure efficient administration. The governors of the district and the secretary have efficiently and energetically discharged the duties imposed upon them.

DISTRICT OF DAVAO.

The affairs of this district have been handled in a capable and tactful manner by the governor, who has displayed great energy, making frequent inspections and visiting even the most remote mountain districts, explaining the new conditions, district regulations, etc. Long-standing feuds between various tribes have been peacefully settled at a conference arranged by the governor and a general peace established in districts where feuds have existed for generations. There has been a very considerable increase in the number of houses in the district and a number of new native villages have been built up. Over 1,000,000 new hemp plants have been set out and many thousand cocoanuts. At the present time the amount of hemp growing in this district is greater than can be harvested with the laborers available. There are comparatively few Moros in the district.

The remarks made concerning municipal affairs in the district of Zamboanga apply with equal force to municipal affairs in the district of Davao. All municipalities have required close supervision and frequent inspection. This is a condition by no means remarkable when the limited experience of these people in self-government is considered. They are good followers, and with good men at the head of local affairs are tractable and entirely willing to work for good government; but when a bad man happens to be presidente the lack of public spirit is made apparent by the entire failure on the part of the people to make a stand in behalf of good administration.

There have been a good many attempts on the part of the comparatively civilized people on the seacoast to peon the uncivilized people

of the interior and compel them to dispose of their products most disadvantageously to themselves. All instances of this kind have been followed up and systematic effort made to break up this practice and to establish municipal governments under the best native officials available.

DISTRICT OF LANAO.

In the district of Lanao conditions have been disturbed throughout the year by frequent attacks by Moros upon troops, hunting parties, and individual soldiers; also by acts of lawlessness, such as the raiding of Filipino settlements on the seacoast for slaves, and frequent attacks upon the hill tribes for the purpose of procuring women and robbing the people of their crops and supplies. These acts of armed hostility and lawlessness have been summarily dealt with in all instances where the Moros refused to surrender offenders. It is not believed that there will be any further organized resistance—certainly none of serious importance. There are one or two districts whose sultans have shown indications of hostility, but have not as yet actually committed themselves to the policy of resisting the duly organized government of the province. It is probable that for several years to come we shall have sporadic outbreaks by a few fanatics here and there in this and other Moro regions. There is probably a dato, sultan, or other petty chief for every 15 or 20 men in the district. The people are densely ignorant and very suspicious, and are easily played upon by the Arab priests, who, it is believed, are responsible very largely for the attitude of the people.

The work of the governors of the district has been difficult and trying in character, but has been efficiently and satisfactorily performed.

During the past year crops throughout the province have been good, with the exception of the cocoanut crop, which was poor during the first six months. The people everywhere have enough to eat, and, so far as known, are secure in the possession of their property and families. The province has great natural resources, which are almost entirely undeveloped. There is an almost unlimited amount of valuable timber, a great deal of it easily accessible, and there is a very large amount of fine agricultural land, well adapted to cocoanut, hemp, rice, sugar—in short, most of the island products. Rubber plants and rubber trees exist in large numbers; also gutta trees, although a comparatively small amount of this is at present being brought out. Nearly all tropical fruits grow well in the province. All that is wanted is some one to develop and make use of its almost inexhaustible resources.

Lumber companies complain of the present forestry law, and there has been no development in this industry during the past year; in fact, two lumber mills in the province have ceased operations. It is possible that after further trial of the present law there may be a revival of the industry. At present, in the midst of an almost inexhaustible forest of excellent lumber, we are building barracks and quarters and oftentimes private buildings with lumber brought from America, a condition which ought not to exist.

What is needed to develop this portion of the world is a suitable class of settlers, bringing with them knowledge of modern agricultural methods, enterprise, and some capital. Such a class of settlers

will do much to introduce higher standards of industrial and agricultural capacity, standards which must be established before the native will take steps to change his present methods, which are all that he knows; and unless he has before him the example of what can be done in this really remarkable country it is not believed that his present primitive methods will be materially changed. If he could see the results of better agricultural methods and better industrial methods generally it is believed that his ambition would be stimulated and that his development would be comparatively rapid. In short, a scattering of good agriculturists throughout the province would be of inestimable value to the people, individually and as a whole.

At the present time such a class of settlers is not coming, and it is not believed that they will come until much more liberal inducements are offered them, especially in the way of obtaining land by settlement. The prospect of obtaining by settlement, even under the most favorable conditions, 40 acres of land is not a sufficient inducement to influence ambitious and industrious settlers to come to the remote East. If it is desired that enterprising settlers come here it is held that much greater inducements must be held out to them than at present. It is believed that it is only through such a class of settlers that these islands can be developed to the best interests of the inhabitants and of the United States. What is needed here is an influx of such people as built up the West. The natives would be stimulated by their example and educated by their work, and the possibilities of these islands would soon be apparent.

It is recommended that the amount of land obtainable under the homestead clause of the present land law be increased to 200 acres, under conditions requiring cultivation yearly of a fixed amount of the land and completion of improvements to be prescribed.

It is difficult to imagine a richer country or one out of which more can be made than the island of Mindanao and adjacent islands, but development requires intelligence, energy, and capital.

Transportation facilities in the province are exceedingly limited. Practically everything is by water. There are very few roads, and they run from the seacoast to nearby towns. Coastwise steamship lines are much needed. At present there are practically no such lines in operation in this province. The United States army transports in the service of the Quartermaster Department do all the business of the military establishment, and transport by way of courtesy a large number of people who have no connection whatever with government affairs. The coast-guard ships of the insular government transact most of the government business and carry its freight and passengers and also transport many private parties. The effect of these two lines, while undoubtedly a convenience to the military and civil authorities, has been to drive the coastwise steamship companies out of business, thereby causing a most unfortunate condition, which tends to greatly hamper the development of the country, for would-be investors hesitate to establish themselves where there are no adequate means of transportation. There is great difficulty in obtaining supplies and still greater difficulty in marketing products.

It is recommended that the interisland transports be wholly, and the coast-guard boats very largely, given up, and that long-term con-

tracts, under a subsidy arrangement, be entered into with steamshi lines. Such a course will, it is believed, greatly decrease the e: penses of both the insular and military governments and tend eno mously to build up and develop the country. Such agreemen should embody a maximum rate for private passengers and freigh It is believed that such a procedure will be, in addition to effectir a saving, of the greatest benefit to the insular government and tl Government of the United States, as it will tend to stimulate tl development of the natural resources of these islands.

There is nothing in the climate of this portion of the islands whi prohibits long residence here. The British residents of North Born and the Malay Peninsula and the Dutch in Java manage to li apparently very contented and healthy lives in those countries, whi are hotter than any portion of the Philippine Islands. While tl service is in a way severe, it does not seem to deter the avera Englishman or Dutchman from competing eagerly for positions the government of the colonies, and it is believed that America can live and do good work where any other white race can. A mor life, with plenty of hard work, will be found to counteract in mo cases the so-called demoralizing effects of the Philippine climate.

Our standing among the people of these islands has been muc injured by the presence of a large and tough class of so-called Ame icans, whose energies have been principally expended in the co struction, maintenance, and patronage of rum shops, which outnun ber other American business establishments.

Young Americans of the best class are much needed in all branch of the government, especially as representatives of the governme in remote districts among the half-civilized peoples, where their infl ence for good would be of the greatest value. It is believed th the procurement and retention of men of this class would be facil tated if they could be sure of continuance in service, promotion, an if they are to be prohibited from entering into business while actin as representatives of the government, a pension upon retirement aft thirty years' service. It is from the Americans in the islands th the people are forming their ideas of the American nation, and it most important that our representatives should be the best obtainabl

A considerable amount of opium is smuggled into the province. is earnestly recommended that the most stringent regulations b enacted in regard to the importation, sale, and use of opium. Noth ing has had a more demoralizing effect upon the Moros and savag peoples than opium, and it will absolutely destroy them if its impo tation and use is authorized. It is believed that all the best mind now engaged in colonial development are at the bottom convince of the fearfully pernicious effect of the use of opium in the easter countries and would gladly get rid of it at any cost if they coul The Philippines are, from an eastern standpoint, practically uncon taminated by this, the most deadly and degrading of all vices. Whil the revenue from its sale would undoubtedly be great, it is believe that the ultimate loss in the character and energy of the peopl would many times counterbalance it. It is believed that a license t smoke opium, sufficiently low to avoid fraud, should be issued thos hopelessly addicted to the habit, and that exceedingly severe penaltie should attach to those who furnish opium to youth or those who ar

nonsmokers. Such a system will, if honestly followed out, gradually dispose of the smokers and eradicate the evil. The Japanese are accomplishing this in Formosa. It is a poor policy in developing a people to count on the income of legalized vice for a large portion of the revenue, as is done in most eastern colonies.

It is recommended that the duty on Chinese tobacco imported into the Moro Province be reduced 75 per cent. The Moros use Chinese tobacco altogether and will not have any other, even if it is given to them. The present duty is high and leads to smuggling and other irregularities. The reduction in duty would be much appreciated by the Moros, and it is not believed that there would be any loss in revenue to the government, as with a small duty there would be little incentive to smuggling.

It is also recommended that the cost of registering boats of Moro and Pagan construction of more than 10 tons burden be reduced to 5 pesos. The Moros are anxious to register their boats, but find the cost, from their standpoint, to be excessive. What is especially desired is to get them into the habit of registering their boats, paying taxes, etc. The best way to do this is believed to be by small fees until the system is established.

It is recommended that steps be taken to induce the United States Government to authorize the construction of all barracks and quarters from native lumber, which, while costing little more, is much more durable and, generally speaking, insect proof.

It is also recommended that experiments be made for the purpose of ascertaining what grasses suitable for forage can best be developed in these islands. A very considerable source of revenue would be furnished the people if forage consumed by the Army could be furnished by the agriculturists of the islands rather than imported. Such a procedure would also effect a very considerable saving to the United States Government.

It is urgently recommended that the portion of the province of Misamis, situated west of the Bay of Iligan and adjoining the subdistrict of Dapitan, be transferred to the Moro Province. After more than a year of observation and study of existing conditions no good reason for this territory continuing as a portion of the province of Misamis is apparent. Its people and their interests are identical with those of the Moro Province. Its coast settlements are Filipinos, as are all the principal coast towns of the Moro Province. Its hill people are Subanos, as are the hill people in the subdistrict of Dapitan, which adjoins it. A few Moro settlements are scattered along the coast, as they are along the coast of the Zamboanga Peninsula and the southern portion of Mindanao. The territory is bounded by the territory of the Moro Province on the west and by the Bay of Iligan on the east. The town of Misamis in the district in question is 85 miles from Cagayan by sea and by land 114 miles by difficult trail. As the situation now stands it means that out of what should be the territory of the Moro Province one of the most populous and richest sections has been carved and attached to a distant province, thereby introducing into the administration of affairs a peculiar situation. The hill tribes find themselves divided between two jurisdictions. A different system of schools and of general administration exists within narrow territorial limits, and people whose interests are identical in every way with those of the Moro Province are made a part

of a province with which it has no land communication except b passing over nearly 100 miles of the Moro Province, and no sea co munication except as above stated. It is maintained that the exis ing situation is most prejudicial to the interests of the Moro Provin and disadvantageous to the people of the territory under discussio which naturally forms a part of this province and should be made part of it.

It is suggested that consideration be given to the question of th advisability of uniting to the Moro Province, for the purpose economy and uniformity of administration of the affairs of peop whose interests are identical, the provinces of Misamis and Surig these provinces to constitute districts of the Moro Province and governed accordingly. The peoples inhabiting these provinces pr sent practically the same administrative problems as are presente in the Moro Province. The bulk of the population in all is mad up of semicivilized peoples, and for the purpose of bringing order o of the confusion existing among them a uniform general poli should apply. It is believed that a very considerable economy wou result.

It is recommended that the government farm at San Ramon b transferred to the control of the authorities of the Moro Provinc This farm is distant from Zamboanga 15 miles by trail, and i interests are intimately connected with those of the district of Zam boanga and the Moro Province in general. It is the purpose of th provinical government, in case this farm is transferred to it, t develop it as a nursery for hemp plants, for sale and distributio among the people of the province. Up to the present time the far has remained very largely undeveloped and, so far as is known, ha not been either self-supporting or of any material assistance eithe to the agricultural interests of the province or of the islands. Th farm comprises some 8,000 acres of arable land and can be made very great value to the people of this part of the island and of th province, and through it much can be accomplished to encourage an develop the hemp industry, and valuable work can be done in th way of improving the class of cocoanuts being planted throughou the province.

It is recommended that steps be taken to establish some procedu by which would-be American citizens can become such in the Philip pine Islands. There have been a number of attempts made by mo desirable men, possessing capital, to become American citizens. A present there is no way of this being done without going to th United States. It is believed that a procedure similar to tha adopted in Porto Rico would at least have the merit of overcomin the present difficulty. The present condition seems an unfortunat one to encounter in a new country which we are trying to develo It is believed that prompt measures should be taken to so remed existing conditions that one can become a United States citizen (t the extent at least of the requirements of the laws in force here) i these islands without having to go to and remain in the United State proper to accomplish it.

There has been a great increase in the cost of living and in wage in this as in other provinces, an increase which has not been accom panied either by improved methods or increased production. Th

cause of the increase can be traced in most cases to the foolishly high prices paid by army officials for labor. The resulting situation is a trying one to the farmer and producer generally. Men whose methods are as crude and capacity for output as limited as they were ten years ago are demanding higher wages than the farmer can afford to pay, as he is employing the old crude methods and will until he is shown how to improve on them. If the increased cost of labor had been accompanied by the introduction of methods or mechanical devices which enabled the laborer to accomplish more, the effect would not have been bad. As it is, considerable time and patience will be required to adjust matters. The reduction in the number of laborers required by the Army and a reduction in the wages paid by its representatives will help the situation from the producer's standpoint and tend to establish normal conditions.

The provincial government is at present engaged in correspondence with various steamship companies looking to the subsidizing of several small steamers to make trips about the island of Mindanao, from Cateel, on the east coast, to Iligan, on the west, including the Sulu Archipelago, for the purpose of picking up jungle produce, hemp, timber, and plantation products and bringing them to Zamboanga for shipment to foreign ports, and also for the purpose of distributing supplies from Zamboanga to the various outlying places. The propositions thus far received have been deemed excessive. In fact, the policy of high prices pursued by the steamship companies in the early days of the occupation, which necessitated the establishment of a coast-guard line and the extensive use of interisland transports for the Army, is still indicated in the proposals received.

A provincial hospital is much needed, and a project is now under consideration to purchase suitable land in Zamboanga and to erect thereon a provincial hospital, on plans which will permit its gradual development to meet the needs of the province. Thus far sick natives have been taken care of in United States military hospitals in very many cases.

Surveys have been completed and estimates made, the project submitted, and approval recommended for the construction by the military authorities of a narrow-gauge railroad from Overton, on the seacoast, to Marahui, on Lake Lanao. The road can be built and equipped for $315,000 gold, and the cost of its construction would be almost saved by the military authorities in a single year in the cost of transporting supplies to lake posts. It is hoped that this plan will be eventually approved, as it is believed that it would not only be a great economy to the military establishment, but would be of immense service in developing the rich and fertile country about Lake Lanao, which, in addition to its agricultural possibilities, from its elevation furnishes a most desirable place for recuperation from diseases incident to the Tropics.

The constabulary force in this province has been most efficiently and ably handled by Col. J. G. Harbord, district chief, fifth district, and the relations which have existed between the military and civil forces have been those of cordial cooperation. The constabulary work has been well and satisfactorily done.

The relations between civil and military authorities have been cordial, and the military establishment as a whole has done all in its power to assist the provincial government.

The provincial governor desires to express his appreciation of the valuable service rendered by the members of the legislative council, provincial and district officials, as follows:

To Capt. George T. Langhorne, aid-de-camp, for efficient and able services in the organization and conduct of the secretary's office.

To Mr. Fred A. Thompson, provincial treasurer, for most capable and thorough conduct of the affairs of his department in all portions of the province.

To Capt. Charles Keller, provincial engineer, for painstaking and efficient work in the organization of the department of public works, the purchase of supplies, and the conduct of such public work as has been undertaken.

To Dr. Najeeb M. Saleeby, provincial superintendent of schools, for efficient and painstaking performance of the duties of his office.

To Mr. John E. Springer, provincial attorney, for the efficient performance of the duties pertaining to his office and for excellent work in drafting acts of the legislative council.

To Col. Hugh L. Scott, governor of the district of Sulu, for the very able and most efficient manner in which he has handled a complex and difficult situation.

To Capt. John P. Finley, governor of the district of Zamboanga, for conscientious and careful performance of the duties of his office.

To Maj. Robert L. Bullard, governor of the district of Lanao, for very efficient and hard work in the conduct of the affairs of his district up to the date of his relief, June 30, 1904, and

To Capt. Daniel B. Devore, governor of the district of Lanao since June 30, 1904, for efficient performance of duty.

To Capts. Carl Reichmann and Robert O. Van Horn, governors of the district of Cottabato, for efficient conduct of the affairs of their district.

To Lieut. E. C. Bolton, governor of the district of Davao, for the very efficient performance of the duties of his office and for the excellent results obtained.

To Capt. John R. Proctor, jr., Capt. Oscar J. Charles, and Mr. Frank J. Dunleavy for efficient performance of duty as secretaries to the governors of the districts of Zamboanga, Sulu, and Cottabato, respectively.

To Mr. Thomas R. Henderson, for his performance of duty as secretary of the district of Davao.

To Mr. Charles B. McGhee, deputy provincial treasurer and treasurer of the district of Zamboanga, for thoroughly efficient performance of the duties of his office.

To Mr. Burdette A. Crumb, treasurer of the district of Sulu; Mr. Stephen R. Beard, treasurer of the district of Cottabato; Mr. George W. C. Sharp, treasurer of the district of Davao, and Mr. Loren L. Day, treasurer of the district of Lanao, for efficient performance of the duties of their offices.

To Mr. Charles R. Morales, chief clerk, for thoroughly efficient and able performance of his duties as chief clerk.

Very respectfully,

LEONARD WOOD,
Major-General, U. S. Army, Governor.

The CIVIL GOVERNOR OF THE PHILIPPINE ISLANDS.

APPENDIXES.

[ACT No. 19.]—AN ACT Appropriating the sum of sixty five thousand one hundred and fifty eight pesos, in Philippines currency, or so much thereof as may be necessary in part compensation for the fiscal year nineteen hundred and four, and for other purposes.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums, in Philippines currency, or so much thereof as may be respectively necessary, are hereby appropriated, out of any funds in the treasury of the Moro Province not otherwise appropriated, in part compensation for the service of the Moro Province for the second quarter of the fiscal year nineteen hundred and four, unless otherwise stated:

PERSONNEL OF THE MORO PROVINCE.

SALARIES AND WAGES.

Governor's office: One stenographer, class 7, one clerk, class II, one thousand one hundred and ten pesos.

Secretary's office: One chief clerk, class 7, two stenographers, class 8, one clerk, class 10, one clerk, class II, one messenger, at two hundred and forty pesos per annum, three thousand three hundred and seventy pesos.

Attorney's office: Provincial attorney, at eight thousand pesos per annum, assistant attorney, at five thousand pesos per annum, one clerk, class D, one clerk, class K, three thousand seven hundred and thirty pesos.

Treasurer's office: Provincial treasurer, at eight thousand pesos per annum, one examiner, class 8, at three thousand pesos per annum, one clerk, class K, at three hundred and sixty pesos per annum, two thousand eight hundred and forty pesos.

Engineer's office: One chief clerk, class 8, two clerks, class J, one thousand one hundred pesos.

Office of the Superintendent of Schools: Superintendent of Schools, at eight thousand pesos per annum, one clerk, class 9, two translators, class A, one messenger, at one hundred and eighty pesos per annum, three thousand seven hundred and forty five pesos.

In all, for salaries and wages, Personnel of the Moro Province, fifteen thousand eight hundred and ninety five pesos.

REGULAR SUPPLIES.

Office furniture and fixtures, stationery, etc., four thousand pesos.

RENTS.

For provincial offices, courts of first instance, jail houses, etc., one hundred and fifty pesos.

TRAVELING EXPENSES AND SUBSISTENCE.

For provincial officials and employees, when on necessary official business, two hundred pesos.

TRANSPORTATION.

Transportation of freight, purchase of horses, wagons, carabaos, etc., three hundred pesos.

MISCELLANEOUS EXPENSES.

Cables, postage, doctor's fees, expense carrying out sanitary regulations, public surveys, advertising, etc., two hundred pesos.

ADMINISTRATION OF JUSTICE.

Fees for sheriffs, subsistence and transportation of prisoners, charges criminal proceedings, fees medical attendance on prisoners, transportation and subsistence of judges and court officials, supplies for jails and prison hospitals, one thousand pesos.

WHARVES AND DOCKS.

Repair and construction of wharf at Zamboanga, four thousand pesos.

SCHOOLS.

Salaries: Thirteen teachers, class 9, seven teachers, class 10, two teachers, at one thousand eight hundred pesos per annum, one teacher, at one thousand two hundred pesos per annum, two teachers, at eight hundred and forty pesos per annum, six teachers, at six hundred pesos per annum, fifteen teachers, at four hundred and eighty pesos per annum, thirty teachers, at three hundred and sixty pesos per annum, twelve teachers, at three hundred pesos per annum, eighteen thousand four hundred and twenty pesos.
Rents: two thousand pesos.
Books and supplies: six thousand pesos.
Construction and repair of buildings: five hundred pesos.
Traveling expenses: two hundred and fifty pesos.
In all, for school purposes, twenty seven thousand one hundred and seventy pesos.

DISTRICT OF ZAMBOANGA.

SALARIES AND WAGES:

Governor's office: One interpreter, class C, one interpreter, class D, one messenger, at two hundred and forty pesos per annum, eight hundred and forty pesos.
Secretary's office: One chief clerk, class 9, one typewriter, class C, one interpreter, class D, one clerk, class K, one thousand six hundred pesos.
Treasurer's office: District treasurer, at three thousand eight hundred pesos per annum, one clerk, class H, seven hundred and twenty pesos per annum, one clerk, class K, at three hundred pesos per annum, one clerk, class K, at two hundred and forty pesos per annum, one thousand two hundred and sixty five pesos.
In all, for salaries and wages, District of Zamboanga, three thousand seven hundred and five pesos.
Traveling expenses and subsistence: One hundred and fifty pesos.
Administration of justice: Four hundred pesos.

DISTRICT OF SULU.

SALARIES AND WAGES:

Governor's office: One stenographer, class 8, one interpreter class A, one messenger, at two hundred and forty pesos per annum, one thousand three hundred and sixty pesos.
Secretary's office: One clerk, class 10, one janitor, at one hundred and ninety two pesos per annum, six hundred and forty eight pesos.
Treasurer's office: District treasurer, at three thousand two hundred pesos per annum, one deputy, at four hundred and eighty pesos per annum, one janitor, at two hundred pesos per annum, nine hundred and seventy pesos.
In all, for salaries and wages, District of Sulu, two thousand nine hundred and seventy eight pesos.
Traveling expenses: One hundred and fifty pesos.
Rents: Office buildings, etc., one hundred and sixty pesos.
Administration of justice: Four hundred pesos.

DISTRICT OF COTTABATO.

SALARIES AND WAGES:

Treasurer's office: District treasurer, at three thousand six hundred pesos per annum, one deputy, at four hundred and eighty pesos per annum, one janitor, at two hundred pesos per annum, one thousand and seventy pesos.
Traveling expenses: One hundred and fifty pesos.
Rents: Office buildings, etc., one hundred and twenty pesos.
Administration of justice: Four hundred pesos.

DISTRICT OF DAVAO.

SALARIES AND WAGES:

Treasurer's office: District treasurer, at three thousand two hundred pesos per annum, one deputy, at four hundred and eighty pesos per annum, one janitor, at two hundred pesos per annum, nine hundred and seventy pesos.

Traveling expenses: One hundred and fifty pesos.

Rents: Office buildings, etc., one hundred and twenty pesos.

Administration of justice: Four hundred pesos.

DISTRICT OF LANAO.

SALARIES AND WAGES:

Treasurer's office: District treasurer, at three thousand pesos per annum, one deputy, at four hundred and eighty pesos per annum, one janitor, at two hundred pesos per annum, nine hundred and twenty pesos.

Total appropriations for all purposes, sixty five thousand one hundred and fifty eight pesos, in Philippines currency, or so much thereof as may be necessary.

SEC. 2. The appropriations herein made shall be withdrawn from the treasury of the Moro Province in Philippines currency, or in United States currency at the option of the provincial treasurer.

SEC. 3. There not being sufficient unappropriated balances on hand to complete the above appropriation, the provincial treasurer is hereby authorized to transfer, in his discretion, to the credit of the various appropriations, the present unappropriated balances in the general and customs funds. Balances due appropriations after the above transfers, shall be made upon receipt of sufficient deposits hereafter received from provincial and customs revenues, until the said appropriation of sixty five thousand one hundred and fifty eight pesos in Philippines currency is provided for.

SEC. 4. The sum of five hundred and seventy nine pesos and sixty seven centavos, Philippines currency, is hereby appropriated out of any funds in the treasury of the Moro Province, not otherwise appropriated, for the hereinafter mentioned employees of the Government of the Moro Province, in lieu of salary as emergency employees before appointment and taking oath of office:

(*a*) Secretary's office: Charles R. Morales, for service rendered as clerk from the eighteenth day of September to the sixth day of October, nineteen hundred and three, both dates inclusive, at an annual salary of three thousand pesos, one hundred and fifty eight pesos and thirty centavos; Thomas J. Fox, for service rendered as clerk from the first day of October to the sixth day of October, nineteen hundred and three, both dates inclusive, at an annual salary of three thousand pesos, fifty pesos; Sidney S. Johnson, for service rendered as clerk from October first to October sixth, nineteen hundred and three, both dates inclusive, at an annual salary of one thousand eight hundred pesos, thirty pesos, two hundred and thirty eight pesos and thirty centavos.

(*b*) Treasurer's office: Pedro Urbina, for service rendered as clerk (janitor) from the tenth day of September to the thirteenth day of October, nineteen hundred and three, both dates inclusive, at an annual salary of two hundred and forty pesos, twenty one pesos and two centavos.

(*c*) Office of the Superintendent of Schools: Felix Saavedra, for services rendered as messenger from the eleventh day of September to the thirtieth day of September, nineteen hundred and three, both dates inclusive, at an annual salary of one hundred and eighty pesos, ten pesos.

(*d*) Governor's office, District of Sulu: Edward Schuck, for services rendered as interpreter from the tenth day of September to the thirtieth day of September, nineteen hundred and three, both dates inclusive, at an annual salary of one thousand eight hundred pesos, one hundred and five pesos.

(*e*) Secretary's office, District of Sulu: Adolf C. C. Gunther, for service rendered as clerk from the fourth day of September to the tenth day of October, nineteen hundred and three, both dates inclusive, at an annual salary of two thousand pesos, two hundred and five pesos and thirty five centavos.

In all five hundred and seventy nine pesos and sixty seven centavos.

SEC. 5. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, October 13th, 1903.

Approved by the Philippine Commission November 23, 1903.

[ACT No. 20.]—AN ACT To provide for the allowance of traveling expenses and subsistence expenses of provincial and district officials and employees, and to repeal section three of Act Numbered Seventeen.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Whenever any provincial or district official or employee shall be absent from his usual place of residence on official business, his actual and necessary traveling expenses and subsistence expenses, the latter not to exceed three pesos, Philippines currency, per day, shall be refunded by appropriation from provincial funds. Provided, that no teacher, and no subordinate employee in the office of the provincial governor, secretary, treasurer, superintendent of schools, engineer or attorney, or in the office of the governor, secretary or treasurer of a district, shall be allowed traveling and subsistence expenses, unless it shall appear that the travel by which such expenses were incurred was undertaken by virtue of the written order of the head of his department. The provincial treasurer shall draw up rules governing the preparation and presentation of vouchers for such expenses, and shall cause a copy of such rules to be furnished to all provincial and district officials and employees.

SEC. 2. Section 3 of Act No. 17 of the Legislative Council of the Moro Province is hereby repealed.

SEC. 3. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, October 17, 1903.

Approved by the Philippine Commission November 23, 1903.

[ACT No. 21.]—AN ACT Providing for the establishment of the municipalities of Mati, Davao, Makar, Cottabato, Malabang, Dapitan, Cateel, Baganga and Caruga, and enlarging the municipalities of Iligan and Zamboanga.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The municipalities of Mati, Davao, Makar, Cottabato, Malabang, Dapitan, Cateel, Baganga and Caraga are hereby established with boundaries as prescribed for each in sections 2, 3, 4, 5, 6, 7, 8, 9 and 10, and the municipalities of Iligan and Zamboanga are hereby enlarged with boundaries as prescribed in sections 11 and 12. The provisions of the Municipal Code now in force in the Philippine Islands, except as hereinafter modified, are extended to the municipalities established by this act.

SEC. 2. The municipality of Mati shall include all territory between the 7th parallel of N. Lat., and Cape St. Augustine, bounded on the east by the Pacific Ocean, on the west by the waters of the Seno de Davao, and shall include in addition to the mainland, all the islands lying off the coast within a distance of three marine leagues except the islands of Taluna, Samal and Santa Cruz, which shall be included in the municipality of Davao. The municipal town shall be Mati.

SEC. 3. The municipality of Davao shall include the islands of Taluna, Samal, Santa Cruz and the Sarangani Islands, the portion of the mainland on the east side of the Seno de Davao north of the 7th parallel of N. Lat., as well as that west of the north and south running watershed of the mountains lying to the northeast of the Seno de Davao, south of the parallel of latitude 7 degrees, 15 minutes north, and east of the western boundary of the district of Davao as prescribed in act No. 787, of the Philippine Commission. The municipality shall also include all islands within the three marine league limit of the shore lines of the mainland and of the Sarangani Islands and all of the Seno de Davao not included in the municipality of Mati. The municipal town shall be Davao.

SEC. 4. The municipality of Makar shall include all territory of the mainland lying between the parallel of six degrees, 15 minutes, N. Lat., the eastern boundary of the district of Cottabato and a line following the general trend of the coast line and distant three marine leagues therefrom, terminating upon the parallel of 5 degrees, 30 minutes, N. Lat. The municipal town shall be Makar.

SEC. 5. The municipality of Cottabato shall include all of the mainland and its adjacent islands lying north of the parallel of latitude 7 degrees N., bounded on the east by a line starting at a point on the parallel of 7 degrees N. Lat., distant about 55 miles from the intersection of this parallel and the coast line, and running N., 35 degrees W., to the eastern boundary of the district of Lanao on the west by the eastern boundary of the district of Lanao and a line parallel to the coast line and distant three marine leagues therefrom. The municipal town shall be Cottabato.

SEC. 6. The municipality of Malabang shall include all territory lying north and west of the eastern boundary of the Lanao district, south of the watershed of the mountains which run approximately northwest, following the watershed to its intersection with the meridian 127 degrees, 30 minutes east of San Fernando, and east of the latter meridian, including also all the islands within the three marine league limit. The municipal town shall be Malabang.

SEC. 7. The municipality of Dapitan shall include the territory bounded on the north by the ocean, on the east by the line separating Misamis from the Moro Province, on the south by the 8th parallel of N. Lat., and on the west by the Sea of Jolo, including in addition all islands within the three marine league limit. The municipal town shall be Dapitan.

SEC. 8. The municipality of Cateel shall include all territory bounded on the east by the Pacific Ocean, on the north by the 8th parallel of N. Lat., on the west by the watershed of the mountains parallel to the coast and on the south by the parallel of latitude about 7 degrees, 35 minutes north which runs through the middle of the swamp lying between the Rio Matuban and the pueblo of Quinablangan, and all islands within the three marine league limit. The municipal town shall be Cateel.

SEC. 9. The municipality of Baganga shall include all territory bounded on the east by the Pacific Ocean and on the north by the southern boundary of the municipality of Cateel as described in Section 8, on the west by the watershed of the mountains parallel to the coast, on the south by the east and west line equidistant from the villages of San Luis and Baculin and all islands within the three marine league limit. The municipal town shall be Baganga.

SEC. 10. The municipality of Caraga shall include all territory bounded on the east by the Pacific Ocean and on the north by the southern boundary of the municipality of Baganga as described in Section 9, on the west by the watershed of the mountains parallel to the coast line, on the south by the 7th parallel of N. Lat., and all islands within the three marine league limit. The municipal town shall be Caraga.

SEC. 11. The limits of the municipality of Iligan are hereby extended to include all territory of the Moro Province north of the 8th parallel of N. Lat., and east of the Mipangi River, its boundaries being the 8th parallel of N. Lat. on the south, the waters of the Panquil and Iligan Bays on the west, the parallel of latitude through Salinbal Point on the north and the meridian 128 degrees, 8 minutes of east longitude on the east. All islands within the three marine league limit shall also be included. The municipal town shall be Iligan.

SEC. 12. The limits of the municipality of Zamboanga are hereby extended so as to include all territory of the Zamboanga peninsula south of the parallel of latitude 7 degrees, 30 minutes N., the Island of Basilan and all islands distant three marine leagues either from the mainland or from the Island of Basilan. The municipal town shall be Zamboanga.

SEC. 13. Municipal elections shall be held as may hereafter be provided in the Municipal Code of the Moro Province. Pending such municipal elections, the District Governors are authorized to appoint municipal officials, such appointments being subject to approval by the Legislative Council of the Moro Province. Municipal officials now holding office shall be permitted to serve until the conclusion of their terms of office unless sooner removed for cause in accordance with the provisions of act No. 787, of the Philippine Commission.

SEC. 14. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, October 29th, 1903.

Approved by the Philippine Commission November 23, 1903.

[ACT No. 25.]—AN ACT To provide for the organization of the office of the district governor, district of Lanao, to provide salaries for the employees thereof and to fix the salary of the secretary of said district.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Subject to the provisions of Act No. 5 of the Philippine Commission and its subsequent amendments, there shall be employed in the office of the District Governor of the District of Lanao, the following subordinate employees:

(*a*) One clerk, class A.

(*b*) One interpreter, class H.

(*c*) One messenger, at an annual salary of not to exceed one hundred and twenty dollars ($120.00), U. S. currency.

SEC. 2. The District Secretary of the District of Lanao shall receive an annual salary of not to exceed one thousand five hundred dollars ($1,500.00), U. S. currency, to be fixed by the Governor of the Moro Province in the appointment.

SEC. 3. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, December 7, 1903.

Approved by the Philippine Commission January 6, 1904.

[ACT No. 26.]—AN ACT Appropriating the sum of fifteen thousand two hundred and thirty-seven pesos and twelve centavos, Philippine currency, or so much thereof as may be necessary, to pay various expenses of the government of the Moro Province for the first and second quarters of the fiscal year nineteen hundred and four, not provided for in the general appropriation acts for the first and second quarters.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums in Philippines currency, or so much thereof as may be respectively necessary, are hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated, in part compensation for the service of the Moro Province for the fiscal year ending June thirtieth, nineteen hundred and four, being for the first and second quarters of the said fiscal year, unless otherwise stated.

GOVERNMENT OF THE MORO PROVINCE.

SALARIES, WAGES AND ALLOWANCES.

Governor's office: Provincial Governor, from July 25, 1903, to December 31, 1903, at three thousand three hundred pesos, Philippines currency, per annum, being twenty per cent of his current yearly pay as an Army officer, one thousand four hundred and thirty pesos.

Secretary's office: Provincial Secretary, from August 18, 1903, to December 31, 1903, at twelve hundred pesos per annum, being twenty per cent of his current yearly pay as an Army officer, four hundred and forty-three pesos and thirty-three centavos.

Engineer's office: Provincial Engineer, from August 18, 1903, to December 31, 1903, at one thousand one hundred and twenty pesos per annum, being twenty per cent of his current yearly pay as an Army officer; Walter E. Chunyut, class 8, from October 15, 1903, date of transfer from Iloilo Province, to October 17, 1903, date of taking oath of office in the Moro Province: four hundred and twenty-two pesos and ten centavos.

Treasurer's office: Fred A. Thompson, Treasurer of the Moro Province, from August 25, 1903, date of transfer from Iloilo Province, to September 1, 1903, prior to date of taking oath of office in the Moro Province, one hundred and fifty-five pesos and fifty-five centavos.

In all for salaries, wages and allowances, two thousand four hundred and fifty pesos and ninety-eight centavos.

[ACT No. 22.]—AN ACT To provide for the employment of a clerk in the office of district governor of Davao, and fixing the salary of the district secretary of the district of Davao.

By authority of the Philippine Commission, be it enacted by the Legislat Council of the Moro Province, that:

SECTION 1. Subject to the provisions of Act No. 5 of the Philippine Commission, and its subsequent amendments, there shall be employed in the office the District Governor of the District of Davao one clerk, class A.

SEC. 2. The District Secretary of the District of Davao shall receive an annual salary of twelve hundred dollars, currency of the United States, or equivalent in Philippines currency.

SEC. 3. Subject to annulment or amendment by the Philippine Commissi this act shall take effect on its passage.

Enacted, October 29th, 1903.

Approved by the Philippine Commission November 23, 1903.

[ACT No. 23.]—AN ACT To provide for the employment of certain subordinate employees in the office of the district governor of the district of Cotabato, and fix the salaries thereof, and fixing the salary of the district secretary of said district.

By authority of the Philippine Commission, be it enacted by the Legislat Council of the Moro Province, that:

SECTION 1. Subject to the provisions of Act No. 5 of the Philippine Commission, and its subsequent amendments, there shall be employed in the office the District Governor of the District of Cotabato, the following subordin employees:

(*a*) One clerk, class J.

(*b*) One interpreter, class II.

(*c*) One messenger at an annual salary of one hundred and twenty doll ($120.00), currency of the United States, or its equivalent in Philippines c rency.

SEC. 2. The District Secretary of the District of Cotabato shall receive annual salary of not to exceed fifteen hundred dollars ($1500.00), currency the United States, or its equivalent in Philippines currency, to be fixed by Governor of the Moro Province in the appointment.

SEC. 3. Subject to annulment or amendment by the Philippine Commissio this act shall take effect on its passage.

Enacted, October 30th, 1903.

Approved by the Philippine Commission November 23, 1903.

[ACT No. 24.]—AN ACT To provide for the employment of one clerk, class nine, addition to those provided for in Act Numbered twelve, in the office of the provinci engineer, and fixing the salary thereof.

By authority of the Philippine Commission, be it enacted by the Legislati Council of the Moro Province, that:

SECTION 1. Subject to the provisions of Act No. 5 of the Philippine Commi sion and its subsequent amendments, there shall be employed in the office of t Provincial Engineer, in addition to those provided for in Act No. 12 of the Le islative Council, one clerk, class 9.

SEC. 2. Subject to annulment or amendment by the Philippine Commissio this act shall take effect on its passage.

Enacted, December 1st, 1903.

Approved by the Philippine Commission January 6, 1904.

[ACT No. 25.]—AN ACT To provide for the organization of the office of the district governor, district of Lanao, to provide salaries for the employees thereof and to fix the salary of the secretary of said district.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Subject to the provisions of Act No. 5 of the Philippine Commission and its subsequent amendments, there shall be employed in the office of the District Governor of the District of Lanao, the following subordinate employees:

(*a*) One clerk, class A.

(*b*) One interpreter, class H.

(*c*) One messenger, at an annual salary of not to exceed one hundred and twenty dollars ($120.00), U. S. currency.

SEC. 2. The District Secretary of the District of Lanao shall receive an annual salary of not to exceed one thousand five hundred dollars ($1,500.00), U. S. currency, to be fixed by the Governor of the Moro Province in the appointment.

SEC. 3. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, December 7, 1903.

Approved by the Philippine Commission January 6, 1904.

[ACT No. 26.]—AN ACT Appropriating the sum of fifteen thousand two hundred and thirty-seven pesos and twelve centavos, Philippine currency, or so much thereof as may be necessary, to pay various expenses of the government of the Moro Province for the first and second quarters of the fiscal year nineteen hundred and four, not provided for in the general appropriation acts for the first and second quarters.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums in Philippines currency, or so much thereof as may be respectively necessary, are hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated, in part compensation for the service of the Moro Province for the fiscal year ending June thirtieth, nineteen hundred and four, being for the first and second quarters of the said fiscal year, unless otherwise stated.

GOVERNMENT OF THE MORO PROVINCE.

SALARIES, WAGES AND ALLOWANCES.

Governor's office: Provincial Governor, from July 25, 1903, to December 31, 1903, at three thousand three hundred pesos, Philippines currency, per annum, being twenty per cent of his current yearly pay as an Army officer, one thousand four hundred and thirty pesos.

Secretary's office: Provincial Secretary, from August 18, 1903, to December 31, 1903, at twelve hundred pesos per annum, being twenty per cent of his current yearly pay as an Army officer, four hundred and forty-three pesos and thirty-three centavos.

Engineer's office: Provincial Engineer, from August 18, 1903, to December 31, 1903, at one thousand one hundred and twenty pesos per annum, being twenty per cent of his current yearly pay as an Army officer; Walter E. Chunyut, class 8, from October 15, 1903, date of transfer from Iloilo Province, to October 17, 1903, date of taking oath of office in the Moro Province: four hundred and twenty-two pesos and ten centavos.

Treasurer's office: Fred A. Thompson, Treasurer of the Moro Province, from August 25, 1903, date of transfer from Iloilo Province, to September 1, 1903, prior to date of taking oath of office in the Moro Province, one hundred and fifty-five pesos and fifty-five centavos.

In all for salaries, wages and allowances, two thousand four hundred and fifty pesos and ninety-eight centavos.

REGULAR SUPPLIES.

Office furniture and fixtures, stationery, etc., two thousand pesos; contingent fund, for repairs, labor, etc., of office furniture, fixtures, etc, fifty pesos.
In all for regular supplies two thousand and fifty pesos.

TRAVELING EXPENSES.

For the actual and necessary traveling expenses of Fred A. Thompson, Treasurer of the Moro Province, while traveling on official business during the period from July 15, 1903, to October 16, 1903; twenty-two pesos; for the actual and necessary traveling expenses of N. M. Saleeby, Superintendent of Schools, Moro Province, while traveling on official business during the period from July 1 to October 16, 1903, thirty-seven pesos and fifty centavos. For Provincial officials and employees while traveling on official business, three hundred pesos. In all for traveling expenses, three hundred and fifty-nine pesos and fifty centavos.

DISTRICT OF ZAMBOANGA.

SALARIES, WAGES AND ALLOWANCES.

Governor's office: District Governor, from September 2, to December 31, 1903, at twelve hundred pesos per annum, being twenty per cent of his current yearly pay as an Army officer; Juchi Nuño, interpreter, from October 1 to October 12, 1903, while employed as temporary clerk before taking oath of office, four hundred and thirty-six pesos and sixty-six centavos.
Secretary's office: District Secretary, from October 1, to December 31, 1903, at eight hundred and sixty pesos per annum, being twenty per cent of his current yearly pay as an Army officer, to two hundred and sixteen pesos.
Information fund: For hire of necessary guides, couriers, etc., two hundred and fifty pesos.
In all for salaries, wages and allowances, District of Zamboanga, nine hundred and two pesos and sixty-six centavos.

RENTS.

To reimburse Carter D. Johnston, Disbursing Officer, Bureau of Justice, for rent of court house at Zamboanga, for the period from July 15 to July 31, 1903, at forty-three pesos and forty-eight centavos per month, twenty-three pesos and twenty centavos; for rent of court house at Zamboanga, from August 1 1903, to December 31, 1903, at forty-three pesos and forty-eight centavos per month, two hundred and seventeen pesos and forty centavos; for rent of building used as sub-district offices at Isabela de Basilan, from October 1, 1903, to December 31, 1903, at thirty pesos per month, ninety pesos.
In all for rents, three hundred and thirty pesos and sixty centavos.

CONSTRUCTION AND REPAIR OF PUBLIC BUILDINGS.

For repairs to temporary district jail, one hundred pesos.

TRANSPORTATION.

To complete repairs of boat "Governor Finley," property of the Moro Province, one hundred pesos; for labor hire of crew for boat "Governor Finley", eight pesos and sixty-seven centavos.
In all for transportation, one hundred and eighty pesos and sixty-seven centavos.

ADMINISTRATION OF JUSTICE.

For clothing and subsistence of prisoners for the period from July 15, to September 30, 1903, two hundred pesos.

DISTRICT OF SULU..

SALARIES, WAGES AND ALLOWANCES.

Governor's office: District Governor, from September 2, 1903, to December 31, 1903, at fifteen hundred pesos per annum, being twenty per cent of his current yearly pay as an Army officer, four hundred and ninety-five pesos and eighty-three centavos.

Secretary's office: District Secretary, from September 29, 1903, to December 31, 1903, at nine hundred and thirty-six pesos per annum, being twenty per cent of his current yearly pay as an Army officer, two hundred and thirty-nine pesos and twenty centavos.

Treasurer's office: B. A. Crumb, District Treasurer, from September 22, 1903, date of transfer from Pangasinan Province, to September 30, 1903, date of taking oath of office in the Moro Province, eighty pesos.

Information fund: For hire of necessary guides, couriers, etc., seven hundred and fifty pesos.

In all for salaries, wages and allowances, District of Sulu, one thousand five hundred and sixty-five pesos and three centavos.

RENTS.

For rent of court house at Jolo, from July 15, 1903, to December 31, 1903, at twenty-six pesos and nine centavos per month, one hundred and forty-four pesos and thirty-seven centavos.

ADMINISTRATION OF JUSTICE.

For subsistence and clothing of prisoners, for the period from July 15, to September 30, 1903, one hundred pesos.

DISTRICT OF COTABATO.

SALARIES, WAGES AND ALLOWANCES.

Governor's office: District Governor, from September 9, to December 31, 1903, at twelve hundred pesos per annum, being twenty per cent of his current yearly pay as an Army officer; one clerk, class H; one clerk, class J; one messenger at two hundred and forty pesos per annum: six hundred and fifty-three pesos and thirty-three centavos.

Secretary' office: District Secretary, at three thousand pesos per annum, five hundred pesos.

Information fund: For hire of necessary guides, couriers, etc., five hundred pesos.

In all for salaries, wages and allowances District of Cotabato, one thousand six hundred and fifty-three pesos and thirty-three centavos.

ROADS AND BRIDGES.

For construction of landing for small boats on the Rio Grande at Cotabato, five hundred pesos; for repair of bridge about one and one-half miles from Parang on the Parang-Cotabato Road, five hundred pesos: in all for roads and bridges, one thousand pesos.

ADMINISTRATION OF JUSTICE.

For subsistence and clothing of prisoners for the period from July 15, to September 30, 1903, fifty pesos.

DISTRICT OF DAVAO.

SALARIES, WAGES AND ALLOWANCES.

Governor's office: District Governor, from October 28, to December 31, 1903, at seven hundred and twenty pesos per annum, being twenty per cent of his current yearly pay as an Army officer; one clerk, class A: four hundred and fifty-nine pesos and thirty-three centavos.

Secretary's office: District Secretary, at twenty four hundred pesos per annum: four hundred pesos.

Treasurer's office: George W. C. Sharp, District Treasurer, from September 25, 1903, date of transfer from Antique Province, to October 7, 1903, date of taking oath of office in the Moro Province, sixty-five pesos.

Information fund: For hire of necessary guides, couriers, etc., five hundred pesos.

In all for salaries, wages and allowances, one thousand four hundred and twenty-four pesos and thirty-three centavos.

ADMINISTRATION OF JUSTICE.

For subsistence and clothing of prisoners for the period from July 15 to September 30, 1903, fifty pesos.

ROADS AND BRIDGES.

For reconstruction of road from the town of Davao to the landing on Davao Bay, fifteen hundred pesos.

DISTRICT OF LANAO.

SALARIES, WAGES AND ALLOWANCES.

Governor's office: District Governor, from November 11 to December 31, 1903, at fifteen hundred pesos per annum, being twenty per cent of his current yearly pay as an Army officer; one clerk, class A; one clerk, class H; one clerk, class K: four hundred and twenty-five pesos and sixty-six centavos.

Secretary's office: District Secretary at three thousand pesos per annum, two hundred pesos.

Information fund: For hire of necessary guides, couriers, etc., five hundred pesos.

In all for salaries, wages and allowances, one thousand one hundred and twenty-five pesos and sixty-six centavos.

ADMINISTRATION OF JUSTICE.

For subsistence and clothing of prisoners for the period from July 15 to September 30, 1903, fifty pesos.

Total appropriations for all purposes, fifteen thousand two hundred and thirty-seven pesos and twelve centavos, Philippines currency, or as much thereof as may be necessary.

SECTION 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, December 10, 1903.

Approved by the Philippine Commission January 6, 1904.

[ACT No. 27.]—AN ACT Regulating the sale of intoxicating liquors, and repealing Act Numbered Seven hundred and nine of the Philippine Commission in its application to the Moro Province.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The provisions of this act shall apply to all saloons, bars and other drinking places within the limits of the Moro Province, whether operating under and by virtue of municipal licenses or provincial licenses, or both. The words "drinking place" where they occur in this act shall be construed to include every bar-room or club-room of a social club or other organization in which intoxicating liquors are sold by retail; and the member, agent, steward or other person in charge of or employed in the service of intoxicating liquors in such club or organization shall be punishable for the commission of any act herein declared to be unlawful.

SEC. 2. Where the sale, gift or delivery of intoxicating liquors is made unlawful by this act, the provisions hereof shall be so construed that no trick, device,

subterfuge or pretense shall be allowed to evade the operation or defeat the policy of the act, if intoxicating liquor be thereby procured.

SEC. 3. It shall be unlawful for any person or persons to conduct or maintain any saloon, bar or drinking place without first having obtained the proper license or licenses therefor, or for any employee or agent of a saloon, bar or drinking place to sell or give away any intoxicating liquor when the proper license or licenses have not been issued to his principal authorizing the same. In prosecutions under this section the burden of proof shall be upon the defendant to show that such license or licenses have been issued.

SEC. 4. All saloons, bars or other drinking places shall be closed from ten o'clock, postmeridian, until six o'clock, antemeridian, the following day, and from ten o'clock postmeridian, Saturday, until six o'clock antemeridian, the following Monday; and it shall be unlawful for any person to sell, give away or otherwise dispose of any fermented, malt, vinous or spirituous or other intoxicating liquors between the above mentioned hours, but the words "give away" as used in this section shall not apply to the giving away of intoxicating liquors by a person in his private dwelling, in the private boarding house of which he is a regular guest, or in the private mess of which he is a regular member, unless such dwelling, boarding house or mess becomes a place of public resort. The presence of people in a saloon, bar or other drinking place during such hours shall be considered prima facie evidence of the unlawful sale, gift or other disposition of intoxicating liquors.

SEC. 5. It shall be unlawful for the proprietor of any saloon, bar or other drinking place

(*a*) To maintain any but a clean, quiet and orderly place.

(*b*) To use or permit to be used any part of his premises for purposes of prostitution or assignation.

In prosecutions arising under the two preceding paragraphs evidence of specific unlawful acts shall not be necessary; but the offence may be proved by evidence of the notorious character of such premises as a filthy or disorderly place or as a place of prostitution or assignation.

(*c*) To permit or conduct any gambling or game of chance or gambling device on any part of his premises.

(*d*) To permit any obscene or indecent picture, engraving or other representation or exhibition to be posted or displayed in any part of his premises.

(*e*) To sell, give away or deliver, or permit to be sold, given away or delivered any intoxicating liquors to any intoxicated person or to any person of known intemperate habits.

(*f*) To sell, give away or deliver, or permit to be sold, given away or delivered any intoxicating liquors, knowing that such intoxicating liquors are intended for sale, gift or delivery to any intoxicated person or to any person of known intemperate habits, whether such sale, gift or delivery be thereafter actually consummated or not.

(*g*) To permit intoxicated persons or persons of known intemperate habits to remain in or about the premises where intoxicating liquors are kept for sale.

In prosecutions arising under paragraphs (*e*) and (*g*) of this section and under paragraph (*f*) for the sale, gift or delivery of intoxicating liquors to any person knowing that such intoxicating liquors are intended for sale, gift or delivery to a person of known intemperate habits, knowledge on the part of the defendant of the intoxication or of the known intemperate habits shall not constitute an element of the offense. For the purposes of construing the three preceding paragraphs an intoxicated person shall be deemed to be a person so far under the influence of intoxicating liquor that his passions are visibly excited or his judgment visibly impaired by the liquor.

(*h*) To keep or sell any wine, beer or liquor, except such as is of good standard quality and free from adulteration.

SEC. 6. It shall be unlawful for any person, not an officer or enlisted man of the United States Army, Navy or Marine Corps to sell, give away or deliver any intoxicating liquors to any person within the limits of a military or naval reservation or within any quarters or premises used exclusively by the United States Army, Navy or Marine Corps. The unexplained possession by a person, not an officer or enlisted man of the United States Army, Navy or Marine Corps, of intoxicating liquors within any military or naval reservation, quarters or premises used exclusively by the United States Army, Navy or Marine Corps, found under circumstances indicating an intent to sell, give away or deliver the same unlawfully, shall also be unlawful. The Commanding Officer of any mili-

tary or naval reservation, or of any post or station to which any quarters premises used exclusively by the United States Army, Navy or Marine Co pertain, may seize any intoxicating liquors not the property of an enlisted m or officer of the United States Army, Navy or Marine Corps, found within s reservation, quarters or premises. He shall cause such intoxicating liquors be delivered to the president of the nearest municipality, who shall cause same to be sold at public auction, after due notice of sale posted in three pul places within the municipality for at least one week prior to the date set the for. The proceeds of such sale shall constitute a part of the municipal funds

SEC. 7. It shall be unlawful for any person to sell, give away or deliver a of the so-called "native wines" such as "vino", "anisado", "tuba", etc., any enlisted man of the United States Army, Navy or Marine Corps, or to s give away or deliver any of such liquors to any person, knowing that su liquors are intended for sale, gift or delivery to any enlisted man of the Uni States Army, Navy or Marine Corps, whether such sale, gift or delivery thereafter actually consummated or not.

SEC. 8. It shall be the duty of every holder of a license for the sale of into cating liquors to keep it posted in a conspicuous place in the room where i liquors are sold, and failure to do so is hereby declared to be unlawful.

SEC. 9. Every person who violates any of the provisions of this act is gui of a misdemeanor and upon a first conviction therefor shall be punished imprisonment not exceeding three months, or by a fine not exceeding fifty d lars, or both. Upon a second conviction under this act for the same or a d ferent offense he shall be punished by imprisonment not exceeding six mont or by a fine not exceeding one hundred dollars, or both, and his license licenses shall become null and void as a consequence of such second convicti Thereafter no license for the sale of intoxicating liquors shall be issued to su person and should such license be issued to him it shall be null and void.

SEC. 10. The Commanding Officer of any Military or Naval reservation, p or station, within a radius of two miles from which the offense shall have be committed, shall have concurrent jurisdiction over such offense with the just of the peace of the municipality in the following cases only:

(*a*) Prosecutions arising under sections six and seven of this act, and (prosecutions arising under paragraphs (*e*), (*f*) and (*g*) of section five of t act when the intoxicated person or persons of known intemperate habits is enlisted man of the United States Army, Navy or Marine Corps. In the ex cise of the jurisdiction herein conferred upon him, such commanding officer sh have and exercise the powers conferred upon justices of the peace by la Prosecutions before him shall conform to the rules relating to process, pleadi practice and procedure now or hereafter established for courts of justice of t peace of the Philippine Islands, and all rights of appeal thereby secured sh be allowed to defendants prosecuted under this act. Any order for arr issued by authority of this act may be executed by a military, naval or mari officer or enlisted man designated for that purpose by the officer commandi as justice of the peace. Defendants convicted or held for trial under this shall be imprisoned in the manner and the place provided for the imprisonme of defendants convicted or held for trial by the civil courts. Commandi officers acting as justices of the peace by virtue of this section shall not entitled to fees as justices of the peace for service so rendered; nor shall mi tary, naval, or marine officers or enlisted men making arrests or serving proc be entitled to fees for said services. All fines and cost imposed by commar ing officers by virtue of this act shall be paid to the treasurer of the distr in which the offense was committed and shall constitute a part of the funds the Moro Province.

SEC. 11. Act number 709 of the Philippine Commission, and all other laws parts of laws inconsistent with this act in so far as they may have been force heretofore in the Moro Province, are hereby repealed.

SEC. 12. Subject to annulment or amendment by the Philippine Commissi this act shall take effect on January 1, 1904.

Enacted, December 15, 1903.

Approved by the Philippine Commission February 20, 1904.

[ACT No. 28.]—AN ACT Appropriating the sum of one thousand and eighty pesos and ten centavos, Philippines currency, or so much thereof as may be necessary, to defray the current expenses of the town of Jolo, district of Sulu, for the months of November and December, nineteen hundred and three.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The sum of one thousand and eighty pesos and ten centavos, Philippines Currency, or so much thereof as may be necessary, is hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated to defray the current expenses of the town of Jolo, District of Sulu, for the months of November and December, nineteen hundred and three. The said sum may be expended for any public purpose for which municipal funds may be expended in municipalities organized under the provisions of Act No. eighty-two of the Philippine Commission, entitled "The Municipal Code," upon authorization by a majority of a board to be composed of the District Governor, the District Secretary and the District Treasurer of the District of Sulu and four residents of the town of Jolo whom they shall select. The board shall direct the issuance of warrants by resolution spread upon the records of the District Secretary. Warrants shall be issued by the District Governor and shall be countersigned by the District Secretary. All disbursements shall be made by the District Treasurer, who shall render accounts thereof as for other provincial funds disbursed by him for district purposes.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, December 18, 1903.

Approved by the Philippine Commission February 20, 1904.

[ACT No. 29.]—AN ACT To provide that the Moro Province shall be the beneficiary of the collections derived for timber cut and forestry products on government lands returned to the province by the insular government.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. All collections derived for timber cut and forestry products on Government lands within the Moro Province returned to the provincial treasury by the Insular Government from and including the fifteenth day of July, nineteen hundred and three, or which may hereafter be returned thereto, in accordance with the provisions of section 25 of Act No. 787 of the Philippine Commission, shall constitute a part of the general funds of the Moro Province to be expended in the discretion of the Legislative Council for provincial, district and municipal purposes.

SEC. 2. All provisions of law inconsistent with the provisions of this act, in so far as they may have been in force heretofore in the Moro Province, are hereby repealed.

SEC. 3. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, December 21, 1903.

Approved by the Philippine Commission February 20, 1904.

[ACT No. 30.]—AN ACT Extending the time for the payment of the cedula tax for the year nineteen hundred and three in the districts of Cottabato, Lanao and Davao and the sub-district of Dapitan.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The time allowed for the payment of the cedula tax for the year nineteen hundred and three, imposed by act No. five of the Legislative Council of the Moro Province, is hereby extended within the limits of the Districts of Cottabato, Lanao and Davao and the Sub-District of Dapitan, until February fifteenth, nineteen hundred and four.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, January 5, 1904.

Approved by the Philippine Commission February 20, 1904.

[ACT NO. 31.]—AN ACT To amend act numbered one of the Legislative Council of the Moro Province, entitled "An act to provide for the employment of certain subordinate employees in the office of the treasurer of the Moro Province," act numbered three, entitled "An act to provide for the organization of the office of district treasurer of the district of Zamboanga, and fixing the salaries of the employees thereof," act numbered seven, entitled "An act to provide for the organization of the offices of the district treasurers of the districts of Cottabato, Sulu, Davao and Lanao, and fixing the salaries of the employees thereof."

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Act No. 1 of the Legislative Council of the Moro Province, entitled "An act to provide for the employment of certain subordinate employees in the office of the Treasurer of the Moro Province," is hereby amended by striking out Section 1 and inserting the following in lieu thereof:

"SECTION 1. Subject to the provisions of act No. 5 of the Philippine Commission, and its subsequent amendments, there shall be employed in the office of the Treasurer of the Moro Province the following subordinate employees:

(*a*) One examiner, class 8.

(*b*) One clerk, class K."

SEC. 2. Act No. 3 of the Legislative Council of the Moro Province, entitled "An act to provide for the organization of the office of the district treasurer of the district of Zamboanga," is hereby amended by striking out section 1 and inserting the following in lieu thereof:

"SECTION 1. Subject to the provisions of act No. 5 of the Philippine Commission, and its subsequent amendments, there shall be employed in the office of the district treasurer of the district of Zamboanga the following employees:

(*a*) A treasurer of the district, class 6.

(*b*) One deputy, class II.

(*c*) One deputy, class K.

(*d*) One employee at an annual salary of one hundred and twenty dollars ($120.00), currency of the United States, or its equivalent in Philippines currency."

SEC. 3. Act No. 7 of the Legislative Council of the Moro Province, entitled "An act to provide for the organization of the offices of the district treasurers of the districts of Cottabato, Sulu, Davao and Lanao and fixing the salaries of the employees thereof," is hereby amended by striking out sections 1, 2, 3 and 4, and inserting the following in lieu thereof:

"SECTION 1. There shall be employed in the office of the district treasurer of the district of Cottabato the following employees:

(*a*) A treasurer of the district, class 6.

(*b*) One deputy, class J.

(*c*) One employee, at an annual salary of one hundred dollas ($100.00).

SEC. 2. There shall be employed in the office of the district treasurer of the district of Sulu the following employees:

(*a*) A treasurer of the district, class 7.

(*b*) One deputy, class J.

(*c*) One employee, at an annual salary of one hundred dollars ($100.00).

SEC. 3. There shall be employed in the office of the district treasurer of the district of Davao the following employees:

(*a*) A treasurer of the district, class 7.

(*b*) One deputy, class J.

(*c*) One employee, at an annual salary of one hundred dollars ($100.00).

SEC. 4. There shall be employed in the office of the district treasurer of the district of Lanao the following employees:

(*a*) A treasurer of the district, class 8.

(*b*) One deputy, class J.

(*c*) One employee, at an annual salary of one hundred dollars ($100.00)."

SEC. 4. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, January 7, 1904.

Approved by the Philippine Commission February 20, 1904.

[ACT No. 32.]—AN ACT To provide for the employment of certain subordinate employees, in addition to those provided for in acts numbered thirteen and seventeen, in the office of the superintendent of schools and in the public school system of the Moro Province.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Subject to the provisions of act No. 5 of the Philippine Commission, and its subsequent amendments, there shall be employed in the office of the Superintendent of Schools of the Moro Province, in addition to those provided for in act No. 13 of the Legislative Council of the Moro Province, one clerk, class 8.

SEC. 2. Subject to the provisions of act No. 5 of the Philippine Commission, and its subsequent amendments, there shall be employed in the public school system of the Moro Province, in addition to those provided for in act No. 17 of the Legislative Council of the Moro Province, one teacher of English, class 8, two teachers of English, class 9, six school janitors at monthly salaries not to exceed five dollars ($5.00) currency of the United States, or its equivalent in Philippine currency.

SEC. 3. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, January 15, 1904.

Approved by the Philippine Commission February 20, 1904.

[ACT No. 33.]—AN ACT Appropriating the sum of ninety-two thousand four hundred and sixteen pesos, in Philippines currency, or so much thereof as may be necessary, in part compensation for the fiscal year nineteen hundred and four, and for other purposes.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums, in Philippines currency, or so much thereof as may be respectively necessary, are hereby appropriated, out of any funds in the treasury of the Moro Province, not otherwise appropriated, in part compensation for the service of the Moro Province for the third quarter of the fiscal year nineteen hundred and four, unless otherwise stated:

GOVERNMENT OF THE MORO PROVINCE.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: Provincial Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one stenographer, class 7; one clerk, class H: one thousand nine hundred and thirty-five pesos.

Secretary's Office: Provincial Secretary, twenty per centum of his current proper yearly pay as an officer of the United States Army; one chief clerk, class 7; two stenographers, class 8; one clerk, class 10; one clerk, class H; one messenger, at two hundred and forty pesos per annum: three thousand six hundred and fifty pesos.

Attorney's Office: Provincial Attorney, at eight thousand pesos; assistant attorney, at three thousand two hundred pesos; one clerk, class D; one clerk, class K: three thousand two hundred and eighty pesos.

Treasurer's Office: Provincial Treasurer, at eight thousand pesos; one examiner, class 8; one clerk, class K: two thousand nine hundred and twenty pesos.

Engineer's Office: Provincial Engineer, twenty per centum of his current proper yearly pay as an officer of the United States Army; one chief clerk, class 8; one clerk, class 9; two clerks, class J: two thousand and eighty pesos.

Office Superintendent of Schools: Superintendent of Schools, at eight thousand pesos; one clerk, class 8; one clerk, class 9; two translators, class A; one messenger, at one hundred and eighty pesos per annum: four thousand five hundred and forty-five pesos.

In all, for salaries, wages and allowances, Government of the Moro Province, eighteen thousand four hundred and ten pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of provincial officers a employees, five hundred pesos.

CONTINGENT EXPENSES.

For the purchase of office furniture, fixtures and supplies, ten thousand peso for repairs to same, three hundred pesos; for rents for provincial offices a jail houses, five hundred pesos; for transportation of freight, purchase of hors wagons and carabaos, one thousand pesos; for subsistence and transportati of prisoners, supplies for jails and prison hospitals, and other expenses incident to the administration of justice, one thousand pesos; for construction a repair of public buildings, five hundred pesos; for cablegrams, postage, docto fees, carrying out of sanitary regulations, public surveys, advertising and oth incidental expenses, two hundred pesos: thirteen thousand five hundred pesos

SCHOOL DEPARTMENT.

Salaries: One teacher, class 8; fifteen teachers, class 9; seven teacher class 10; two teachers, at one thousand eight hundred pesos per annum; o teacher, at one thousand two hundred pesos per annum; two teachers, at eig hundred and forty pesos per annum; six teachers, at six hundred pesos p annum; fifteen teachers, at four hundred and eighty pesos per annum; thir teachers, at three hundred and sixty pesos per annum: twelve teachers, at thr hundred pesos per annum; six employees, at one hundred and twenty pes per annum: twenty-three thousand six hundred pesos.

Transportation: For the actual and necessary traveling expenses of teacher two hundred and fifty pesos.

Contingent Expenses: For the purchase of books and supplies, nine thousa pesos; for the transportation of freight, two hundred and fifty pesos; for t construction and repair of school buildings, four thousand pesos; for rents school buildings, one thousand six hundred pesos: fourteen thousand eig hundred and fifty pesos.

In all, for school department, thirty-eight thousand seven hundred pesos.

In all, for the Government of the Moro Province, seventy-one thousand o hundred and ten pesos.

DISTRICT OF ZAMBOANGA.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his curre proper yearly pay as an officer of the United States Army; one interprete class C; one interpreter, class D; one messenger, at two hundred and fort pesos per annum: one thousand one hundred and forty pesos.

Secretary's Office: District Secretary, twenty per centum of his current prop yearly pay as an officer of the United States Army; one chief clerk, class 9; o typewriter, class C; one interpreter, class D; one clerk, class K: one thousa eight hundred and sixteen pesos.

Treasurer's Office: Treasurer of the district, class 6; one deputy, class H; o deputy, class K; one employee, at two hundred and forty pesos per annum: o thousand three hundred and ninety pesos.

In all, for salaries, wages and allowances, District of Zamboanga, four tho sand three hundred and forty-six pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and e ployees, three hundred pesos.

CONTINGENT EXPENSES.

For rents of district offices and jail, one hundred and eighty pesos; for re of district jail from the seventh to the thirty-first day of December, ninete hundred and three, at a monthly rental of sixty pesos, forty-eight pesos; f construction and repair of public buildings, five hundred pesos; for expenses i cidental to the administration of justice, five hundred pesos; for the hire

crew of the boat "Governor Finley," and other incidental expenses, five hundred and thirty-five pesos: one thousand seven hundred and sixty-three pesos.

In all, for the District of Zamboanga, six thousand four hundred and nine pesos.

DISTRICT OF SULU.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper pay as an officer of the United States Army; one stenographer, class 8; one interpreter, class A; one messenger, at two hundred and forty pesos per annum: one thousand seven hundred and thirty-five pesos.

Secretary's Office: District Secretary, twenty per centum of his current proper yearly pay as an officer of the United States Army; one clerk, class 10; one employee, at one hundred and ninety-two pesos per annum: eight hundred and eighty-two pesos.

Treasurer's Office: Treasurer of the district, class 7; one deputy, class J; one employee, at two hundred pesos per annum: one thousand one hundred pesos.

In all, for salaries, wages and allowances, District of Sulu, three thousand seven hundred and seventeen pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, one hundred and fifty pesos.

CONTINGENT EXPENSES.

For rents of district offices and court house, ninety pesos; for expenses incidental to the administration of justice, and for other incidental expenses, five hundred pesos: five hundred and ninety pesos.

In all, for the District of Sulu, four thousand four hundred and fifty-seven pesos.

DISTRICT OF COTTABATO.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper pay as an officer of the United States Army; one interpreter, class H; one interpreter, class J; one messenger, at two hundred and forty pesos per annum: seven hundred and twenty-five pesos.

Secretary's Office: District Secretary, at three thousand pesos per annum: seven hundred and fifty pesos.

Treasurer's Office: Treasurer of the district, class 6; one deputy, class J; one employee, at two hundred pesos per annum: one thousand two hundred pesos.

In all, for salaries, wages and allowances, District of Cottabato, two thousand six hundred and seventy-five pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, two hundred and fifty pesos.

CONTINGENT EXPENSES.

For rents of district offices and court house, two hundred and forty pesos; for expenses incidental to the administration of justice, and for other incidental expenses, four hundred and fifty pesos: six hundred and ninety pesos.

In all, for the District of Cottabato, three thousand six hundred and fifteen pesos.

DISTRICT OF DAVAO.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one clerk, class A: six hundred and eighty pesos.

Secretary's Office: District Secretary, at two thousand four hundred pesos per annum: six hundred pesos.

Treasurer's Office:, Treasurer of the district, class 7; one deputy, class J; one employee at an annual salary of two hundred pesos: one thousand one hundred pesos.

In all, for salaries, wages and allowances, District of Davao, two thousand three hundred and eighty pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, three hundred pesos.

CONTINGENT EXPENSES.

For rents of district offices and court house, one hundred pesos; for expenses incidental to the administration of justice, and for other incidental expenses, four hundred pesos: five hundred pesos.

In all, for the District of Davao, three thousand one hundred and eighty pesos.

DISTRICT OF LANAO.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one clerk, class A; one interpreter, class H; one messenger, at an annual salary of two hundred and forty pesos: one thousand one hundred and forty-five pesos.

Secretary's Office: District Secretary, at three thousand pesos per annum; seven hundred and fifty pesos.

Treasurer's Office: Treasurer of the district, class 8; one deputy, class J; one employee, at an annual salary of two hundred pesos: one thousand pesos.

In all, for salaries, wages and allowances, District of Lanao, two thousand eight hundred and ninety-five pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, two hundred pesos.

CONTINGENT EXPENSES.

For rents of district offices and court house, two hundred and fifty pesos; for expenses incidental to the administration of justice, and for other incidental expenses, three hundred pesos: five hundred and fifty pesos.

In all, for the District of Lanao, three thousand six hundred and forty-five pesos.

Total appropriation, for all purposes, ninety-two thousand four hundred and sixteen pesos, in Philippines currency, or so much thereof as may be necessary.

SEC. 2. The Secretary of the District of Cottabato having performed the duties of his office from the second day of November, nineteen hundred and three, and his formal appointment not having taken effect until the eleventh day of November, nineteen hundred and three, the payment of his salary from the second to the tenth day of November, nineteen hundred and three, both dates inclusive, is hereby authorized, payable from the appropriation "salaries, wages and allowances, District of Cottabato," for the second quarter, fiscal year, nineteen hundred and four.

SEC. 3. The Treasurer of the Moro Province is hereby authorized and directed to transfer on the books of his office a charge against the appropriation for the Moro Province for the credit of the District of Zamboanga in the sum of ninety-nine pesos and twenty-five centavos, Philippines currency, appropriated by act No. 26, in order to charge the entire cost of the boat "Governor Finley" against the said Moro Province.

SEC. 4. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, January 22, 1904.

Approved by the Philippine Commission February 20, 1904.

[ACT No. 34.]—AN ACT Appropriating the sum of eight hundred and ninety-two pesos and eighty-five centavos, Philippines currency, to pay the reward offered by the civil governor of the Philippine Islands for information leading to the arrest and conviction of the murderers of Frank Helm.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. There is hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise apppropriated for the payment to Isidoro Midel and Lorenzo Paragas of their respective portions of the reward of one thousand pesos, Mexican currency, offered by the Civil Governor of the Philippine Islands for information leading to the arrest and conviction of the murderers of one Frank Helm, the sums of five hundred and ninety-five pesos and twenty-three centavos and two hundred and ninety-seven pesos and sixty-two centavos, Philippines currency, respectively. The appropriations herein made are advances of funds to the Insular Government for the purpose of making prompt payment of said reward; and the Treasurer of the Moro Province is hereby directed to charge the same against the Insular Government and to obtain reimbursement therefor.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, January 27, 1904.

Approved by the Philippine Commission February 20, 1904.

[ACT No. 35.]—AN ACT To amend Act Numbered Eighty-two of the Philippine Commission, entitled "The Municipal Code," as amended, in its application to the Moro Province.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

Act No. 82 of the Philippine Commission, entitled "The Municipal Code," as amended, is hereby amended in its application to the Moro Province, to read as follows:

CHAPTER I.—*General provisions.*

SECTION 1. The municipalities of the Moro Province organized previous to the going into effect of this act, under the provisions of act No. 82 of the Philippine Commission, entitled "The Municipal Code," as amended by act No. 21 of the Legislative Council of the Moro Province, are continued and recognized as municipal corporations under this act, with the same boundaries as now existing *de jure* or *de facto*. District boards shall investigate disputes as to the jurisdiction of the municipal governments over places or barrios arising within their respective districts, and shall forward the evidence, together with their recommendations, to the Governor of the Moro Province. The Governor of the Moro Province may require the submission of such further evidence as he may deem necessary, and may, in his discretion, direct the Engineer of the Moro Province to make a survey of the places or barrios in dispute. The Governor's decision in the matter shall be final.

SEC. 2. (*a*) Except as hereinafter provided this act shall not apply to such settlements of Moro or other non-Christian tribes as may be segregated into tribal wards and for which legislation shall be enacted.

(*b*) The jurisdiction of the municipal government shall extend at all times to the persons and property of Moros or other non-Christians not having their legal residences within a tribal ward, and to the persons and property of Christians and foreign non-Christians, whether residing within a tribal ward or otherwise, without regard to the limits of tribal wards; and for this purpose only, such tribal wards, or such part thereof as may lie within the municipality, shall be included within the boundaries of one or more of the barrios of the municipality.

(*c*) Members of Moro or other non-Christian tribes residing within a tribal ward while temporarily absent from such ward and within the limits of a municipality, whether within the limits of another tribal ward or not, shall be subject to the jurisdiction of such municipality as fully and to the same extent as are other transients.

(*d*) In cases of the violation of municipal ordinances or regulations by members of Moro or other non-Christian tribes while without the limits of

their ward and within the limits of the municipality, the process of th municipal president while sitting as a municipal court as hereinafter provide shall run throughout the municipality without regard to the limits of th tribal wards.

(*e*) Where the members of Moro or other non-Christian tribes residin within the limits of any municipality are so intermingled with the Christia and foreign non-Christian inhabitants that it is practicable to separat them into tribal wards the governor of the district in which the municipalit is situated shall, in naming the appointive members of the municipal council appoint such number of members of such tribes that such tribes shall b represented in the municipal council as nearly as possible in proportion t their respective populations. In making the appointments, the governor o the district shall, when practicable, give preference to the local headmen o such tribes.

(*f*) The local headman of each tribal ward within the limits, or partl within the limits, of any municipality, when duly constituted as such b lawful authority, shall by virtue of his office become an honorary member o the municipal council of the municipality. He may, if he desires, attend an regular or special meeting of the council. He may propose measures affectin the general welfare of the municipality, and shall be heard on any measur pending before the council; but he shall not be entitled to a vote thereon.

(*g*) Any member of a Moro or other non-Christian tribe residing in a triba ward may, upon personal application to the district governor and upon estab lishing his identity to the satisfaction of said governor, be transferred fro membership in such tribal ward to regular citizenship in the municipality and shall thereafter be subject to the jurisdiction of the municipality a fully and to the same extent as Christians or foreign non-Christians residen in tribal wards of the municipality. The district governor shall issue to suc applicant a certificate of municipal citizenship and shall forward a duplicat thereof to the municipal secretary, who shall preserve the same in his records

SEC. 3. (*a*) Municipalities incorporated under this act shall be known re spectively by the names adopted by the Legislative Council of the Mor Province. Under such names they may sue and be sued, contract and b contracted with, acquire and hold real and personal property for the genera interests of the municipality, and exercise all the powers hereinafter conferre upon them.

(*b*) All property and property rights vested in any municipality under it former organization shall continue to be vested in the same municipality a incorporated under this act.

SEC. 4. The government of each municipality established under this act i hereby vested in a president, a vice-president, and a municipal council, whic shall be composed in each municipality of twelve councillors. The presiden and one-half of the councillors shall be chosen at large by the qualified elector of the municipality and one-half of the councillors shall be appointed by th governor of the district in which it is situated, with the advice of the Legisla tive Council. The term of office of councillors shall be for two years from an after the first Monday in January next after their election or appointment an until their successors are duly chosen and qualified.

SEC. 5. The municipality shall be divided into barrios and the limits of suc barrios shall be clearly defined, as hereinafter provided in section 38. Fo administrative purposes the barrios may be grouped into municipal districts The number of such municipal districts in the municipality shall be equal to th number of councillors, including the vice-president.

CHAPTER II.—*Qualifications of electors; Elections.*

SECTION 6. The electors charged with the duty of choosing elective munici pal officers shall be male persons, twenty-three years of age or over, who hav had a legal residence in the municipality in which they exercise the suffrag for a period of six months immediately preceding the election, and who are no citizens or subjects of any foreign power, and who are comprised within one o the following three classes:

(*a*) Those who, prior to the thirteenth of August, eighteen hundred an ninety-eight, held the office of municipal captain, gobernadorcillo, alcalde, lieu tenant, cabeza de barangay or member of any ayuntamiento.

(*b*) Those who own real property to the value of five hundred pesos, or wh annually pay thirty pesos or more of the established taxes.

(c) Those who speak, read and write English, Spanish, or any of the Moro languages.

Provided, that officers, soldiers and sailors or marines of the Army and Navy of the United States shall not be considered as having acquired legal residence within the meaning of this section by reason of their having been stationed in the municipality for the required six months; nor shall Moros or other non-Christians acquire legal residence within the meaning of this section by reason of their residence for the required six months in a tribal ward within the limits of the municipality unless they shall have applied for and procured certificates of municipal citizenship in accordance with subsection (*g*) of section 2 of this act.

SEC. 7. Each elector shall, before casting his ballot, take and subscribe the following elector's oath, which shall be administered by the municipal secretary with whom it shall be filed:

Elector's oath.

Moro Province, District of_____
Municipality of_____

I, _____, do solemnly swear, (or affirm) that I am a male resident of the municipality of_____, in the above named province and district, and shall have resided therein for the period of six months immediately preceding the next municipal election; that at the date of said election I shall be _____ years of age; that I am not a subject or citizen of any foreign power; that I shall in all respects be entitled to vote therein at the next election for municipal officers; furthermore, that I recognize and accept the supreme authority of the United States of America, and will maintain true faith and allegiance thereto; that I will obey the laws, legal orders and decrees duly promulgated by its authority; and that I impose upon myself this obligation voluntarily and without mental reservation or purpose of evasion. So help me God. (In case of affirmation the words "So help me God" should be stricken out.)

(Signature of the elector.)

Subscribed and sworn to (or affirmed) before me this _____ day of _____, 190___

(Signature of municipal secretary.)

SEC. 8. The following persons shall be disqualified from voting:

(*a*) Any person who is delinquent in payment of public taxes assessed since August thirteenth, eighteen hundred and ninety-eight.

(*b*) Any person who has been deprived of the right to vote by the sentence of a court of competent jurisdiction since August thirteenth, eighteen hundred and ninety-eight.

(*c*) Any person who has taken and violated the oath of allegiance to the United States.

(*d*) Any person who, on the first day of May, nineteen hundred and one, or thereafter, was, or who hereafter shall be in arms in the Philippine Islands against the authority or sovereignty of the United States, whether such person be an officer, soldier or civilian.

(*e*) Any person who, on the first day of April, nineteen hundred and one, or thereafter, made, or who shall hereafter make contribution of money or other valuable thing in aid of any person or organization against the authority or sovereignty of the United States, or who demanded or received, or who shall hereafter demand or receive such contribution from others, or who made, or shall hereafter make any contribution to any person or organization hostile to or in arms against the authority or sovereignty of the United States, for the purpose of securing any protection, immunity or benefit.

(*f*) Any person who, on the first day of April, nineteen hundred and one, or thereafter, gave, or who shall hereafter give, in any manner whatsoever, aid and comfort to any person or organization in said Islands in opposition to or in arms against the authority or sovereignty of the United States.

Provided, that the provisions of the three paragraphs last preceding shall not apply to members of Moro or other non-Christian tribes, as to acts committed prior to December first, nineteen hundred and three.

(*g*) Insane and feeble-minded persons.

SEC. 9. (*a*) General municipal elections (except the first for which special provision is hereinafter made in Chapter VI), shall be held biennially on the

first Tuesday in December of each year whose final figure is an uneven or odd number, and the officers elected thereat shall enter upon their duties on the first Monday of January following. *Provided*, that the Governor of the Moro Province may, with the consent and approval of the Legislative Council, by executive order postpone municipal elections, whether general or special, when, on account of the prevalence of ladronism, or for other causes, he may deem such a course conducive to the public interest. In order to provide properly for municipal elections, the president, during the first five days of the month of October next preceding the month in which any general election is to be held, shall prepare and cause to be posted a proclamation specifying the place where and the hours during which the elections shall be held, and notifying all persons qualified as electors to appear before the municipal secretary during the first fifteen days of the month in which the proclamation is dated, for the purpose of taking the elector's oath. It shall be the duty of the secretary and he is empowered to administer the oaths, but without fee.

(*b*) One copy of the proclamation shall be posted at the main entrance of the municipal building and one in a public and conspicuous place in each barrio of the town. Between the fifteenth and the twentieth days of the month the president shall prepare from the oaths thus taken a list of the qualified electors, alphabetically arranged according to surnames, and shall post it at the main entrance of the municipal building. He shall further prepare and cause to be posted in a public and conspicuous place in each barrio within the same period an alphabetical list of the qualified electors residing within its limits. Each list shall be accompanied by a notice specifying a term of the last five days of the month in which the proclamation is posted, exclusive of Sundays and legal holidays, during which any qualified voter who has complied with the provisions of the preceding paragraph, or who has in good faith attempted to comply therewith, but has been prevented from so doing by illegal action on the part of the municipal secretary, may demand his proper enrollment as such, and during which any qualified elector may demand the exclusion from the list of qualified electors of the name of any person not possessing the right to vote. Such demands shall be made to the president, who shall promptly refer them for settlement to a Board of Registration, consisting of the vice-president, the municipal treasurer and himself. Where the value of land offered as a qualification for voting is disputed, the value as assessed for taxation shall conclusively determine the same. If there is no assessment, the value shall be determined by the Board. The questions raised before said board shall be determined before the tenth day of the month next following, and the determination shall be immediately communicated in writing to the person whose qualifications as an elector are in question. The president shall forthwith amend the general list and the list for the barrio in which such person is resident by posting therewith a notice of the action taken by the board.

(*c*) Any person aggrieved by the action of the board of registration in excluding his name from the list of qualified electors, or in refusing to enroll his name thereon, may apply in writing to the district board of the district in which the municipality is situated for a review of such action. Any ten qualified electors of the municipality who are dissatisfied with the action of the board in retaining on the list of qualified electors the name of any person whose exclusion therefrom has been demanded, or in including in the list the name of any person not included therein as originally posted, may also apply in writing to the district board for a review of such action. Upon receipt of such application the district board shall proceed immediately to an investigation of the action complained of. It may, in its discretion, summon before it at the capital the parties interested, together with the necessary witnesses, or it may delegate one of its members to go to the municipality, investigate the facts and make report thereon. Its determination in the matter shall be final, and shall at once be communicated in writing to the persons whose qualifications as an elector are in question and to the board of registration. The president shall forthwith amend the list of qualified electors as posted in accordance with the determination of the district board. Provided, that the action of the board of registration or district board shall be without prejudice to the right of any person whose rights as an elector have been injured thereby to pursue his remedy whether by mandate or otherwise to enforce such rights before the proper court.

(*d*) Special elections, duly called in accordance with the provisions of section thirteen, sub-section (*b*) shall be held on the date fixed in the call for the

same. They shall be conducted in accordance with the rules provided for general elections in sections nine, ten, eleven, twelve and thirteen.

SEC. 10. Municipal elections shall be held in the house of the municipality and shall be presided over by a board of election judges, consisting of three qualified electors who are not candidates at such election and who, together with two tellers possessing like qualifications, shall be designated in writing prior to the day of election by a majority vote of a board consisting of those members of the municipal council who have the longest unexpired terms of office.

Should any votes be cast for any member of the board of election judges, said votes shall be void and of no effect. The senior member of the board of judges shall act as its chairman, and the action of the board shall be determined by a majority vote. In case of the absence at the election of any member of the board of judges or of a teller, or his disqualification at any stage of the election, the vacancy or vacancies shall be immediately filled by a majority vote of the entire number of the remaining judges and tellers.

SEC. 11. (*a*) Elections shall be by secret ballot. Only duly qualified electors shall be allowed in the room where an election is being held. A portion of the room shall be cut off by a railing and gate. Within the space thus inclosed the board of judges shall sit, and tables, together with blank ballots and writing materials, shall be placed for the convenience of voters. The tables shall be separated from each other by screens.

(*b*) Blank ballots, with the names of the several offices to be filled printed thereon and with suitable spaces for the insertion of the names of the persons voted for shall be provided in sufficient numbers by the Engineer of the Moro Province before every general or special election. The municipality shall pay for the ballots, which shall be furnished at cost price. Ballots on other than the above described official forms will be illegal, unless the Engineer of the Moro Province shall fail to provide the blanks, or to provide them in sufficient number. In the latter event the board of judges will determine and provide the form to be employed.

(*c*) Each elector shall fill out his ballot at one of the tables provided for the purpose, by writing in the names of the persons for whom he desires to vote. He shall then fold his ballot and deposit it in the ballot box, first stating to the board of judges his name and the barrio in which he resides. When he has voted the chairman shall check his name on the official list of voters, in order to avoid the possibility of his voting a second time.

(*d*) The board of judges shall identify the voters and shall exclude the ballot of any one whose name is found not to be included on the official list.

(*e*) The number of electors admitted to the inclosed space shall never exceed the number of tables, nor shall any two persons occupy one table at the same time, except in the case of electors who can not read and write.

(*f*) Any elector who can not read and write shall be assisted in the preparation of his ballot by two persons whom he shall designate, and who shall accompany him to a table. One of the said persons in the presence of the other shall thereupon fill out a ballot in accordance with the dictation of the elector, who shall then deposit it in the usual manner.

(*g*) Before an election the board of judges shall provide a suitable ballot box with a slit in the top for the insertion of ballots. Immediately before the voting begins they shall see that the box is empty and shall lock the same. While an election is in progress the ballot box shall be kept locked and the key shall be constantly in the possession of the chairman of the board of judges, who will not unlock the box or allow it to be unlocked until the board is ready to count the ballots. The box shall not be removed from the presence of the board of judges during the election or until the ballots are counted and the result declared.

(*h*) The hours for voting shall be from eight ante meridian to four post meridian, at which latter time the election shall close.

SEC. 12. A plurality of votes shall be sufficient to elect. In case of a tie vote the candidates who have received the same number of votes shall draw lots for the office in question. The lots shall be prepared by the board of election judges, the drawing shall take place in their presence, and they shall certify to the fact of the drawing and to its result in the election returns.

SEC. 13. (*a*) Immediately after the close of the election the box shall be opened by the chairman in the presence of the board, the ballots shall be canvassed by the board, a certificate of the result of election shall be prepared in duplicate and signed by the members of the board and by the tellers, and the

certificate shall be sufficient warrant for those elected to assume their offices, unless objections are filed as follows: A duplicate, containing the additional statement that a term of three days is granted in which any resident of the town can present to the board, or to the chairman thereof, in writing, such objections as he may deem just and legal against those declared elected, shall be prepared by the board and posted at the main entrance of the municipal building.

(*b*) On the day following said term of three days a duplicate of the election certificate and the objections made, if any, shall be sent by the chairman of the board of judges to the district board. Should the district board, upon investigation and after hearing of evidence, if necessary, find the election legal, they shall, within seven days after the receipt of said documents, direct the newly elected officers to qualify and enter upon their duties on the day fixed by this act, but, if the district board determine that there has been an illegality committed in the election of any officer or that any candidate returned is not eligible, they shall so declare in writing, with the reasons therefor, and shall order a special election to fill the vacancies thus occasioned and shall certify their finding and order to the municipal secretary, who shall spread the same on the records of the council. In determining the legality of the election the district board shall ignore irregularities or informalities which do not prevent the declared result from being the actual will of the electors. The district governor shall issue to each legally elected municipal officer a certificate of election. Certificates of election in blank, sufficient in number for the needs of each district, shall be supplied to the district governor by the Engineer of the Moro Province, who shall purchase them from the Treasurer of the Philippine Islands.

(*c*) Upon the election of a new president and vice-president an accounting shall be had between the incoming and the outgoing municipal officers, and each of the latter shall turn over to his successor in office all municipal books, records, accounts and moneys in his possession. The incoming officials shall inform the Attorney of the Moro Province of any irregularities in the management of the municipal funds which they may discover.

SEC. 14. The appointive members of the municipal council shall be appointed in the first fifteen days of the month of November next preceding the first Monday in January on which they are to enter office. Upon approval of the appointments by the Legislative Council the district governor shall immediately issue a certificate of appointment to each councillor so appointed, and shall certify a list of such appointments to the municipal secretary. The municipal secretary shall cause a copy of such certified list to be posted forthwith at the main entrance of the municipal building.

CHAPTER III.—*Officers; their qualifications, duties and compensation.*

SEC. 15. A president, vice-president or councillor shall have the following qualifications in addition to those required of a municipal elector:

(*a*) He shall be twenty-six or more years of age, and shall have had a legal residence in the municipality for at least one year prior to the date of election.

(*b*) He shall intelligently speak, read and write either the Spanish or the English language or the principal local dialect. Provided, that this paragraph shall not apply to councillors appointed in accordance with paragraph (*c*) of section 2 of this act.

SEC. 16. In no case shall there be elected or appointed to a municipal office ecclesiastics, soldiers in active service, persons receiving salaries from provincial, departmental or governmental funds, or contractors for public works of the municipality.

SEC. 17. (*a*) Every person elected or appointed to a municipal office under the provisions of this act shall, before entering upon the duties thereof, take and subscribe before the president or municipal secretary the following oath of office.

Oath of office.

Moro Province, District of _____
Municipality of _____
I, _____ having been _____
_____ as _____ of the municipality
of _____ in the above named province and district, do solemnly swear (or affirm) that I have the prescribed qualifications to hold office in said municipality; that I recognize and accept the supreme

authority of the United States of America and will maintain true faith and allegiance thereto; that I will obey the laws, legal orders and decrees promulgated by its duly constituted authorities; that I impose upon myself this obligation voluntarily, without mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties of the office upon which I am about to enter, so help me God.

(Last four words to be stricken out in case of affirmation.)

(Signature of officer.)

Subscribed and sworn to (or affirmed) before me this _____ day of _____, 189__.

(Signature of president or municipal secretary.)

(*b*) Such oaths shall be filed in the office of the municipal secretary.

SEC. 18. Every municipal officer charged with the custody of municipal funds shall, before entering upon the duties of his office, execute a bond to the municipality with two or more sureties, the amount of which bond and the sufficiency of which sureties shall be approved by the president and by the district treasurer in writing endorsed thereon, and by the municipal council by resolution and by a recorded vote, a certified copy of which shall be attached thereto. A copy of the bond and the approval of same shall be spread upon the minutes of the council. The bond shall be fixed at a penal sum of not less than half the amount of the aggregate revenue which will probably come into the custody of the municipal officer during the current year, and shall be conditioned for the faithful performance of the duties of the office and the payment as required by law of all moneys received by such officer for and in behalf of the municipality. The bond shall be filed in the office of the district treasurer. Should suit be brought on this bond it shall be no defense to those signing the bond that the above requirements for approval have not been complied with, if in fact, by virtue of such bond, the municipal officer had entered upon the discharge of his official duties.

SEC. 19. The president shall be the chief executive of the municipality.

(*a*) He shall cause the ordinances of the municipality to be executed, and shall supervise the discharge of official duties by all subordinates.

(*b*) He shall examine and inspect the books, records and papers of every officer or agent employed in the municipality.

(*c*) He shall issue orders relating to the police or to public safety, and orders for the purpose of avoiding conflagrations, floods and the effects of storms or other public calamities.

(*d*) He shall draw warrants on the municipal treasurer for the legitimate payments authorized by the council.

(*e*) He shall assist the district treasurer and his deputies in the collection of taxes.

(*f*) He shall, with the assistance of the municipal treasurer, one councillor, and the secretary, hold such public auctions as may be authorized by the council.

(*g*) He shall hold a court to hear and adjudge alleged violations of public ordinances, upon complaints filed by his direction, or by a public officer, or a private citizen; and, after the due trial in which the accused and his witnesses shall be heard, shall, upon conviction, impose such punishment, either by admonition or by fine and imprisonment, or both, in his discretion, as is provided in subsection (dd) of section 41. Except as hereinafter provided, all proceedings and prosecutions for violations of municipal ordinances shall conform to the rules relating to process, pleading, practice and procedure now or hereafter established for the judiciary of the Philippine Islands; and the president while sitting as a court for the trial of such cases shall have the same powers and privileges as are now or hereafter shall be conferred upon justices of the peace, while sitting in the exercise of their original criminal jurisdiction. The president shall take preferred jurisdiction over all punishable acts mentioned in the Penal Code which are punishable by this act.

(*h*) Fines shall be paid in coin to the treasurer of the municipality, upon the order of the president, and the municipal treasurer shall issue a receipt therefor, which shall be countersigned by the president, who shall upon countersigning it record payment of the same in the docket hereinafter prescribed in paragraph (*j*).

(*i*) *Provided*, that if the charge be against a municipal officer or employee for violating his official duty, the president shall have jurisdiction to suspend him, pending action on such violation by the municipal council; and, if a fine is

imposed against such officer, it may be collected by withholding the requisite amount from such salary as is or may hereafter become due to him.

(*j*) The president shall keep a docket of the trials held under the preceding paragraphs, in which shall be recorded in a summary manner the name of the defendant, the charge against him and the name of prosecuting witness, the date of the arrest, the date of the trial, the presence of the defendant, and the nature of the judgment, together with the fines collected, if any, in accordance with the judgment. A docket with proper blanks for entry of required details shall be furnished to the president by the Engineer of the Moro Province, and the cost of the same shall be paid out of the treasury of the municipality.

(*k*) He shall recommend to the municipal council at any time such measures connected with the public health, cleanliness, or ornament of the municipality or the improvement of its finances as he shall deem expedient. He shall preside at all meetings of the municipal council and shall sign its journal; but he shall not vote, except in case of a tie, when he shall cast the deciding vote. He shall approve ordinances adopted by the municipal council, unless he shall consider them prejudicial to the public welfare, in which case he shall veto them; but the council may pass an ordinance over the veto of the president by a two-thirds vote of all its members, in which case it shall be valid without the signature of the president. If the president shall not either approve or veto an ordinance within five days after its adoption, it shall become a law.

(*l*) He shall appoint, by and with the consent of the majority of all the members of the council, the municipal secretary and all non-elective officers and employees that may be provided for by law or by ordinance, with the exception of the municipal treasurer, and at any time, for cause, he may suspend any such officer or employee, thus appointed, for a period not exceeding ten days, which suspension may be continued for a longer period by the council; and by and with the consent of a majority of all the members of the council, he may discharge any such officer or employee. The municipal treasurer shall be appointed by the district treasurer subject to the approval of the Treasurer of the Moro Province, and may, subject to the approval of the Treasurer of the Moro Province, be removed from office by the district treasurer, for cause. Each municipal treasurer shall render a monthly account, with vouchers, covering all his transactions, to the treasurer of his district, and shall submit to the Treasurer of the Moro Province such reports as that officer may require of him: *Provided*, That all municipal treasurers holding offices at the date of the passage of this act shall continue to exercise the duties of their respective offices until a new appointment is made under the provisions of this act: *And provided further*, That on and after July first, nineteen hundred and four, the position of municipal treasurer shall be classified and subject to all the provisions of the Civil Service act and rules.

(*m*) He shall make all nominations at the first meeting of the council after his election, except for those offices in which a vacancy may occur during his term. In case the council shall reject any of the nominations made by him, then it shall be his duty, at the next regular meeting of the council, to submit the names of other persons for appointment. In case a vacancy occurs in any of the above-named offices during the term of office of the president, he shall submit a nomination to the council of the first regular meeting after the occurrence of the vacancy.

(*n*) During the month of December of each year the President shall prepare and make out in duplicate an annual report, in which he shall set forth the most important events which have occurred in the municipality within the current year. One copy of the report shall be filed in the office of the municipal secretary and the other shall be submitted to the council and thereafter forwarded to the district governor on or before the fifteenth day of the following January.

(*o*) He is authorized to use as a symbol of office a black cylindrical cane, with gold head, gilt ferrule and silver cord and tassels.

SEC. 20. The vice-president shall:

(*a*) Act as substitute for the president in case of absence of the latter or of his temporary inability to discharge the duties of his office.

(*b*) In case of a permanent vacancy in the office of president, he shall fill the post for the unexpired portion of the term; and a new vice-president shall be elected by a majority vote of all the members of the council, as provided in section 41, subsection (*b*).

(*c*) He shall be an *ex-officio* member of the council, with all the rights and duties of any other member, and there shall be assigned to him the barrio or district in which the municipal offices are situated.

(*d*) He is authorized to use as a symbol of office a black cylindrical cane, with gold head, gilt ferrule and black cord and tassels.

SEC. 21. The municipal secretary shall be the clerk of the municipal council, whose meetings it shall be his duty to attend.

(*a*) He shall keep a journal of the proceedings of the municipal council and all records and acts of the municipality.

(*b*) He shall keep his office in the building where the municipal council meets, or at some place convenient thereto, as the council shall direct.

(*c*) He shall keep a civil register for the municipality and shall record therein all births, marriages and deaths, with their respective dates. In case of marriages, he shall further record the previous residences of the contracting parties, the name of the person solemnizing the marriage and the names of the witnesses. In case of death, the causes of death shall be recorded when known. Physicians and midwives residing within the limits of the municipality shall immediately forward to the municipal secretary notification of every birth or death that occurs under his or her professional observation, together with the necessary information for making the proper entry in the civil register. Every person resident within the limits of the municipality who is authorized by law to celebrate marriages shall immediately forward to the municipal secretary notification of every marriage which he celebrates, together with the necessary data for properly recording said marriages in the civil register. All entries in the civil register shall be made by the municipal secretary free of charge.

(*d*) He shall issue upon demand of any person a certified copy of any record within his control, and shall be authorized to charge and receive a fee, which shall not exceed, for both the writing and certificate, ten centavos, Philippines currency, per one hundred words. The records shall during usual business hours be open to inspection by all residents of the municipality and by all officers of the district, provincial, departmental and general governments.

(*e*) He shall when required by the president attend the sessions of the municipal court, and perform such duties as clerk, amanuensis or bailiff, as the president may direct.

(*f*) He shall countersign and certify to the correctness of all warrants ordered by the council to be drawn on the treasury of the municipality.

(*g*) He shall perform all such other duties as the municipal council may by ordinance provide, or as may be imposed by general legislation.

SEC. 22. The municipal treasurer shall receive all moneys paid into the municipality from any source.

(*a*) He shall give to every person paying money to the municipal treasury a receipt therefor, specifying the date of payment and upon what account paid.

(*b*) He shall keep a detailed account of all moneys received, and shall pay the same out only under authority of an ordinance or resolution of the council and upon a warrant signed by the president and countersigned by the secretary.

(*c*) He shall, on or before the third day of each month, make out in triplicate a full and complete statement of the receipts and expenditures of the preceding month, together with a statement of the cash actually on hand in the municipal treasury. He shall deliver two copies to the president, who shall verify them and certify on the face of each as to the correctness thereof, and shall then immediately cause one copy to be posted at the main entrance to the municipal building and send the other copy to the district treasurer.

(*d*) He shall pay all lawful warrants in the order in which they shall be presented, and he shall note on the back of each the date of such presentation and, when payment is made, the date of such payment: *Provided*, That he shall not pay any warrant when there is not in the treasury a sufficient amount to meet warrants previously presented and not paid for want of funds.

(*e*) He shall have his office in the municipal building and shall keep in the municipal safe or strong box, which it shall be the duty of the municipal council to provide, all moneys belonging to the municipality. Such moneys shall be kept separate and distinct from his own money, nor shall it be permitted to make profit out of public money, nor to lend or otherwise use it, nor to use the same in any method not authorized by law. A municipal treasurer violating the foregoing restriction shall be dismissed from office, if such violation shall be established at a hearing before the district treasurer. Such violation shall be considered a malversation of funds, to be tried accordingly under the penal law by a court of competent jurisdiction. The district treasurer shall report any such violation to the Attorney for the Moro Province for prosecution. The municipal treasurer may, to prevent the accumulation of too large an amount of money in the strong box of the municipality, when especially authorized by

resolution of the municipal council, deposit for safe-keeping with the district treasurer such sums of money as he will not be obliged to use at once, taking a receipt from the district treasurer. He shall exhibit this receipt to the municipal council at its next meeting, and the municipal secretary shall record the fact of such exhibition and the date and amount of the receipt.

(*f*) He shall be the custodian of all municipal property and shall keep a record thereof in a suitable book.

SEC. 23. (*a*) The president and municipal secretary shall receive such annual salaries as the council shall fix, subject to the approval of the district board; but such salaries shall not exceed, for the president, twelve hundred pesos, and for the municipal secretary, six hundred pesos. The salary of the municipal treasurer shall be fixed by the district board: *Provided*, That the municipal treasurer shall also act as a deputy of the district treasurer and receive such additional compensation therefor, to be paid from provincial funds as the Treasurer of the Moro Province may fix and the Legislative Council approve, anything in the existing law to the contrary notwithstanding.

(*b*) The salary of the president, during the period when the vice-president performs his duties, shall be drawn by the vice-president.

(*c*) The vice-president, except when serving as president, and the councillors shall receive no compensation, their offices being honorary.

(*d*) No change of salaries by the council after salaries have been fixed at the organization of the municipality, shall affect that of an officer then elected or incumbent.

SEC. 24. (*a*) A person elected by the people to fill a municipal office shall not be permitted to decline the same, but shall qualify and discharge the duties thereof, unless before election he shall have presented to the judges of election and established to their satisfaction a claim for exemption on the ground:

1. That he has discharged the duties of the same office for two previous terms; or

2. That he is physically disabled; or

3. That he is more than sixty-five years of age.

(*b*) Any person violating the foregoing provision of this section, and being convicted thereof by a court of competent jurisdiction, shall suffer imprisonment for a term not exceeding six months.

SEC. 25. A second re-election to any municipal office is prohibited, except after two years.

SEC. 26. Should any elective municipal officer become permanently incapacitated for the proper discharge of his duties during his term of office, through accident or disease, his office may be declared vacant by the vote of a majority of all the members of the council, and his successor, except in the case of the president, shall be promptly chosen, also by a majority vote of all the members. Any elective municipal officer who has qualified may be allowed to resign in the interest of the public service with the approval of the district board.

SEC. 27. The term of office of all appointive officers, except as otherwise provided in this act, shall be until the end of the term of the president appointing them and until their successors are appointed and qualified, unless sooner removed, as provided in this act.

SEC. 28. Every officer of the municipality shall, at the expiration of his term, deliver to his successor in office, who shall receipt for the same in duplicate, all property, books and effects of every description in his possession belonging to the municipality or pertaining to his office. One copy of the receipt shall be delivered to the retiring officer and the other copy shall be filed with the municipal treasurer. Upon the refusal of the retiring officer to comply with this provision, he shall be liable for all damages caused thereby and to such penalty as may be by ordinance prescribed.

SEC. 29. (*a*) No municipal officer shall be directly or indirectly interested in any contract work, or cockpits, or other permitted games or amusements, or business of the municipality, or in the purchase of any real estate or other property belonging to the corporation.

(*b*) Any officer violating the provisions of this section shall, upon a two-thirds vote of all the members of the council, be removed from office; and, upon trial and conviction in a court of competent jurisdiction, shall be imprisoned for not less than six months and not more than two years.

SEC. 30. The president, vice-president, councillors and lieutenants of barrio of the municipality shall be *ex-officio* conservators of the peace of the municipality, and may exercise any power conferred by law upon members of the municipal police. When any felony shall have been committed within the municipality,

it shall be the duty of the president and the councillor and lieutenant of the district or barrio in which the felony shall have been committed to proceed to a personal investigation thereof and make a report of the facts to the justice of the peace of the municipality. They shall also mail a copy of such report to the Attorney of the Moro Province. They shall aid the authorities in further investigations of the facts surrounding the commission of the felony and in the production of evidence when required. Failure to comply with any of the duties imposed by this section shall be cause for instant dismissal. Any municipal officer who shall have probable cause to believe that any person has committed a felony within the municipality, or, having committed a felony elsewhere, has taken refuge within the municipality, who shall not forthwith report such facts to the justice of the peace or to the president of the municipality or to an officer of the Philippines Constabulary, shall be dismissed from office. He shall also be guilty of a misdemeanor, and upon conviction in a court of competent jurisdiction shall be punished by imprisonment not to exceed one year, or by a fine not to exceed five hundred dollars, or both.

CHAPTER IV.—*The municipal council.*

SEC. 31. (*a*) The municipal council shall prescribe the time and place of holding its meetings. Regular meetings shall be held once in every two weeks and special meetings as often as occasion may demand. Any meeting, regular or special, may, in case the amount of business shall require, be adjourned from day to day until the business is completed.

(*b*) The president or any two members of the council, may call a special meeting by giving written notice of it to each member of the council, which notice shall be served personally or left at his usual place of abode.

SEC. 32. The majority of the council shall constitute a quorum to do business, but a smaller number may adjourn from time to time and may compel the attendance of absentees, under such penalties as may be prescribed by ordinance.

SEC. 33. (*a*) The regular sessions of meetings of the municipal council shall be public and the person presiding has the authority to exact from all present due respect and proper deportment, to prevent disturbances and disorder, and to order the room cleared of any or all present who give reason for such action by improper behavior.

(*b*) The council may hold special sessions with closed doors to consider and vote upon appointments submitted to it by the president.

SEC. 34. The municipal council shall determine its own rules of procedure, and, with the concurrence of two-thirds of the members, the council may suspend, or, subject to the approval of the district governor, may expel any elective member for cause, electing his successor by a majority vote of all the members.

SEC. 35. The council shall keep a journal of its own proceedings. The ayes and nays shall be taken upon the passage of all ordinances, upon all propositions to create any liability against the municipality, and upon any other proposition, upon the request of any member, and they shall be entered upon the journal. The affirmative vote of a majority of all the members of the municipal council shall be necessary to the passage of any ordinance or of any proposition creating indebtedness; but other measures, except as otherwise specially provided in this act or by due authority, shall prevail upon the majority vote of the members present at any meeting duly called and held.

SEC. 36. Every ordinance shall go into effect on the tenth day after its passage, unless the ordinance shall provide that it shall take effect at an earlier or later date. The ordinance on the day after its passage shall be posted by the municipal secretary at the main entrance of the municipal building. He shall certify to the fact of posting and shall spread his certificate upon the minutes of the council, but failure to post an ordinance shall not invalidate the same.

SEC. 37. At the first regular meeting after the election and qualification of a new president, the council shall pass on his nominations to non-elective municipal offices and shall prescribe the duties of all appointed officers and employees when not determined by the provisions of this act.

SEC. 38. The council shall definitely fix the limits of the barrios of the municipality, prescribing for them such boundaries that the barrios, taken collectively, shall include the entire territory of the municipality.

SEC. 39. (*a*) If the number of barrios in a municipality is less than or equal to the number of councillors the council shall put each of its members in immediate charge of a barrio or part of a barrio, so that each barrio shall be under the direction of one or more councillors.

(*b*) If the number of barrios exceeds the number of councillors, including the vice-president, the council shall group the barrios into as many districts as there are councillors, and place each councillor in charge of one such district. Each councillor shall be empowered to appoint one lieutenant in each barrio or part of barrio which comes under his immediate supervision. A lieutenant of barrio shall be a duly qualified elector, shall serve without compensation, and shall report directly to the councillor appointing him. Each councillor shall be empowered to appoint a substitute lieutenant, who shall be a duly qualified elector, for each barrio, or part of barrio, which comes under his immediate supervision, to take the place of the lieutenant of such barrio, or part of barrio, during his temporary absence or inability to perform his duties.

SEC. 40 (*a*) Each councillor shall keep the people of his barrio or barrios informed as to the acts of the council, or other governmental measures which directly concern them, by means of suitable notices posted in a public and conspicuous place in each barrio. He shall serve in the council as the representative of the people of his barrio or barrios and shall bring their special needs to the attention of that body.

(*b*) He shall further promptly inform the president of any unusual or untoward event occurring within the barrios assigned to him.

(*c*) He is authorized to use as a symbol of office a cane with silver head, plated ferrule and black cord and tassels.

SEC. 14. The municipal council shall:

(*a*) Establish and fix the salaries of municipal officers and employees, subject to the limitations expressed in section twenty-three. A list of all salaries authorized by the council shall be posted at the main entrance of the municipal building.

(*b*) Fill a permanent vacancy in the office of vice-president or of elective councillor, from among persons having the necessary qualifications, by a majority vote of all its members. A person thus substituted as vice-president or councillor shall serve only for the unexpired portion of the term for which his predecessor was elected and until his successor shall have been chosen and qualified. The district governor shall fill temporary vacancies in the offices of vice-president, or municipal councillor; and whenever a president, vice-president or councillor is suspended, shall appoint some person to discharge his duties until he is reinstated or until he is removed and the vacancy thus occasioned is filled.

(*c*) Make appropriations for lawful and necessary municipal expenditures.

(*d*) Manage the property of the municipality.

(*e*) Erect all needful buildings for the use of the municipality.

(*f*) Establish fire limits, prescribe the kind of buildings that may be constructed within said limits, and issue permits for the erection of the same, but without charging fees for said permits.

(*g*) Regulate the establishment and provide for the inspection of steam boilers.

(*h*) Provide for lighting the streets and for sprinkling the same in cases where it is deemed desirable.

(*i*) Provide for and regulate the numbering of houses and lots, the posting of the names of the streets on signs erected or affixed in conspicuous places, and the posting of the names of barrios on signs erected or affixed in a conspicuous manner at the intersection of the boundary line of a barrio with any public road or trail.

(*j*) Regulate the construction, care and use of streets, sidewalks, wharves, and piers in the municipality; prevent and remove obstacles and encroachments on the same; and declare and abate nuisances.

(*k*) Construct and keep in repair bridges and viaducts, and regulate the use of the same.

(*l*) Prohibit the throwing or depositing of filth, garbage, or other offensive matter in any street, alley, park, or public square; provide for the suitable collection and disposition of such matter and for cleaning and keeping clean the streets, alleys, parks, and other public places of the municipality.

(*m*) Regulate the keeping and use of animals, in so far as the same affects the public health and the health of domestic animals.

(*n*) Require any land or building which is in an unsanitary condition to be cleansed at the expense of the owner or tenant, and, upon failure to comply with such an order, have the work done and assess the expense upon the land or buildings.

(*o*) Construct and keep in repair public drains, sewers, and cesspools, and regulate the construction and use of private water-closets, privies, sewers, drains, and cesspools.

(*p*) Prohibit the burial of the dead within the centers of population of the municipality and provide for their burial in such proper place and in such manner as the council may determine.

(*q*) Establish or authorize the establishment of slaughterhouses and markets, and inspect and regulate the use of the same.

(*r*) Provide for and regulate the inspection of meat, fruits, poultry, milk, fish, vegetables, and all other articles of food.

(*s*) Adopt such other measures to prevent the introduction and spread of disease as may, from time to time, be deemed desirable or necessary.

(*t*) Establish, regulate and maintain a police department.

(*u*) Provide against the evils of gambling, gambling houses, and disorderly houses of whatsoever sort.

(*v*) Provide for the closing of opium joints and prohibit and punish the keeping or visiting of any place where opium is smoked or sold for the purpose of smoking.

(*w*) Provide for the punishment of mendicants, common prostitutes, or habitual disturbers of the peace.

(*x*) Prohibit and punish intoxication, fighting, and all disorderly conduct.

(*y*) Provide for the arrest, trial, fining, and putting to work on the streets or elsewhere of all persons known to be vagrants, and of persons found within the town without legitimate business or visible means of support.

(*z*) Restrain riots, disturbances or disorderly assemblages.

(*aa*) Regulate or prohibit the running at large of domestic animals within the limits of the municipality.

(*bb*) Prohibit and provide for the punishment of cruelty to animals.

(*cc*) Provide for inspection of weights and measures and enforce the keeping of proper weights and measures by vendors, but without the power to exact fees for such inspection.

(*dd*) Fix penalties for violation of ordinances, but no single penalty shall exceed a fine of two hundred pesos or imprisonment for six months, or both; imprisonment shall be imposed in lieu of unpaid fines at the rate of one day's imprisonment for each peso of the fine. An appeal shall lie to the Court of First Instance, next to be held within the district, in all cases where the judgment shall be for a fine exceeding fifteen pesos or for imprisonment exceeding fifteen days; and it shall be the duty of the Attorney of the Moro Province to appear for and represent the prosecution in such appeal cases. Pending the appeal the defendant shall remain in custody unless released upon sufficient bail, in accordance with the general provisions of law, to await the judgment of the appellate court.

(*ee*) Establish, maintain and regulate municipal prisons.

(*ff*) Establish a post-office and provide for the collection and delivery of mails; but such regulations must be in harmony with the postal service and rules established by the General Government of the Philippine Islands.

(*gg*) Provide by ordinance for the levy of taxes for municipal purposes, within the limitations of law, as hereinafter provided in section forty-five.

(*hh*) License and regulate the selling, giving away or disposing in any manner of any intoxicating, malt, vinous, mixed, or fermented liquors, at retail, in quantities of not more than five gallons, and determine the amount to be paid for such licenses, subject to the limitations of general law.

(*ii*) Make such ordinances and regulations, not contrary to law, as may be necessary to carry into effect and discharge the powers and duties conferred by this act, and such as shall seem necessary and proper to provide for the health and safety, promote the prosperity, improve the morals, peace, good order, comfort, and convenience of the municipality and the inhabitants thereof, and for the protection of property therein; and enforce obedience thereto with such lawful fines or penalties as the municipal council may prescribe under the provisions of paragraph (*dd*), of this section.

SEC. 42. The municipal council is empowered:

(*a*) To order the suspension or removal at any time, for cause, of any nonelective officer, other than nonelective councillors, provided that a two-thirds vote of all members shall be required for such removal.

(*b*) To make such provisions for the care of the poor, the sick, or those of unsound mind as it may deem necessary.

(*c*) To purchase, receive, hold, sell, lease, convey, and dispose of property, real and personal, for the benefit of the municipality, provided that the express authorization of the provincial governor shall be necessary to alienate or constitute any lien upon any real property of the municipality.

(*d*) To employ a lawyer or lawyers when necessary in order to defend the interests of the municipality; but ordinary legal questions shall be submitted to the Attorney for the Moro Province, who shall answer the same in writing free of charge.

(*e*) To provide for the erection of markets, public stables, public bathing establishments, wharves and municipal cemeteries and for the establishment of ferries; and to fix reasonable fees for the use of the same.

(*f*) To construct and maintain waterworks for the purpose of supplying the inhabitants of the town with water, and control the use of said water and of water courses within the town.

(*g*) To name streets, avenues and other public places, or change the names thereof.

(*h*) To license, tax, regulate or prohibit the keeping of dogs and authorize the killing of the same when at large contrary to ordinance.

(*i*) To license, tax or prohibit cockfighting and the keeping or training of fighting cocks; and to license, tax or close cockpits: *Provided*, that cockfighting in such cockpits shall take place only on legal holidays and during a period not to exceed three days on the occasion of the celebration of the patron saint's day of the municipality: *And, provided further*, that no game of chance be permitted on the premises.

(*j*) To establish and enforce a dry-earth, pail or other system for the removal of night soil and offensive garbage, and to fix a reasonable and uniform fee to be collected from the beneficiaries thereof.

(*k*) To license public carriages, carts and hearses kept for hire; cafés, restaurants, hotels, inns, and lodging houses; billiard tables, theatrical performances, horse races and circuses and other forms of public entertainment or amusement not prejudicial to public morality.

SEC. 43. Whenever the council is desirous of securing a legal opinion upon questions arising in relation to the constitution or attributes of the municipal government, it shall frame the questions in writing and submit them to the Attorney for the Moro Province for opinion. It shall be the duty of the secretary of the municipal council to forward, immediately after their passage, certified copies of all resolutions, ordinances and other acts of the municipal council, and of formal executive orders of the president which are published, to the governor of the district and to the Secretary of the Moro Province. Such resolutions, ordinances, acts or executive orders shall be subject to annulment or amendment by the Legislative Council of the Moro Province at any time. In case the governor of the district shall think it probable that any act, ordinance or resolution of the municipal council, or any executive order of the municipal president is not within his or its legal power, as conferred by this act, or by general legislation applicable to municipalities of the Moro Province, he shall bring the same to the attention of the Legislative Council. An attempt to enforce an act, ordinance, resolution or executive order, after the Legislative Council shall have annulled it, and after the action of the Legislative Council shall have been brought to the attention of the municipal authorities, shall be sufficient ground for the dismissal of the officer or officers attempting to enforce the same. Nothing in this section shall be construed to deprive any judicial tribunal of power to hold void for want of statutory authority any act, ordinance or resolution of a municipal council or an executive order of a municipal president, the validity of which shall be involved in any cause arising before such tribunal.

CHAPTER V.—*Taxation and finance.*

SEC. 44. Taxation shall be just and in each municipality uniform.

SEC. 45. The revenues of the municipality shall be devoted exclusively to local public purposes. They shall be derived from the following sources only:

(*a*) The granting of the privilege of fisheries (other than pearl or shell fisheries) in fresh-water streams, lakes and tidal streams included within the municipality and not the property of any private individual, and in the marine waters included between two lines drawn perpendicular to the general coast line from points where the boundary lines of the municipality touch the sea at high tide, and a third line parallel with the general coast line and distant from it three marine leagues. Where fresh-water lakes are not included within the limits of any one municipality, or where fresh water or tidal streams form boundaries between municipalities, disputes which may arise as to the waters within which any municipality may exercise the right of taxing the granting of

the privilege of fisheries, shall be referred by each municipality to the district board of the district in which it is situated for settlement.

(*b*) Fees for the issuing of certificates of ownership of large cattle and of transfer of title in the same.

(*c*) Rents and profits from all property belonging to the municipality, tolls from ferries, municipal stables, markets, slaughterhouses, public bath houses, public waterworks and cemeteries belonging to the municipality.

(*d*) Rentals for the privilege of establishing and maintaining the same.

(*e*) Licenses for billiard tables, theatrical performances, horse races and circuses; for the selling at retail in quantities of not more than five gallons of any intoxicating, malt, vinous, mixed or fermented liquors; for the keeping of dogs; for cockpits, cockfighting or the keeping or training of fighting cocks; for public carriages, carts or hearses kept for hire; and for cafés, restaurants, hotels, inns and lodging houses; in accordance with the provisions of section forty-one, subsection (*hh*), and section forty-two, subsections (*h*), (*i*) and (*k*).

(*f*) Municipal fines.

(*g*) Fees from the beneficiaries of dry-earth, pail or other systems for the removal of night soil.

(*h*) Within the center of population of any municipality a uniform annual frontage tax may be imposed upon each person owning, or, in case of doubt as to ownership, upon the person occupying land frontage upon a public thoroughfare, for each meter or part of meter of frontage, upon approval of the district board of the district in which the municipality is situated. The proceeds from such tax shall constitute a special fund which shall be expended only for the purpose of cleaning, repairing and improving the public thoroughfares within the municipal district in which it is imposed. The amount of such tax shall be fixed by the district board, with the approval of the Legislative Council, and shall be collected in the usual manner by the district treasurer during the three months preceding the first day of May of each year.

(*i*) An annual tax, of three pesos, Philippines currency, is hereby imposed for the purpose of protecting the roads of the municipality and districts from destruction, upon each cart, the wheels of which are rigid with the axle to which they are attached, and an annual tax of five pesos, Philippines currency, upon each cart having both such tires and axles, and an annual tax of three pesos, Philippines currency, upon each sledge with runners less than two and one-half inches in width, to be collected by the district treasurer in the usual manner during the three months preceding the first of May of each year. One-half of the proceeds of such tax shall be paid into the municipal treasury and one-half shall be paid into the provincial treasury.

The use of carts with wheels having tires less than two and one-half inches in width and with wheels rigid with the axles and all sledges upon improved or well-constructed public roads in the Moro Province, is hereby prohibited after December first, nineteen hundred and four.

It shall be the duty of the district board of each district in which well-constructed or improved public roads exist to designate by public notice, which shall be posted at the door of the municipal building or presidencia of every municipality in the province, the roads on which it shall be unlawful to use narrow wheeled carts, carts of which the axles are rigid with the wheels, or sledges. Any person violating the provisions of this paragraph by using a cart or sledge of the prohibited type after December first, nineteen hundred and four, upon a road which has been designated as an improved or well-constructed road by the district board of any district, shall be subjected to a fine not to exceed one hundred pesos, Philippines currency, for each offense.

SEC. 46. It shall not be in the power of the municipal council to impose a tax in any form whatever upon goods and merchandise carried into the municipality, or out of the same, and any attempt to impose an import or export tax upon such goods in the guise of an unreasonable charge for wharfage, use of bridges or otherwise, shall be void.

SEC. 47. All taxes, licenses and fees imposed by the council shall be fixed by ordinance and may be changed from year to year, as the council may deem proper.

SEC. 48. The municipal treasurer, during the first fifteen days of January of each year, shall prepare in duplicate itemized statements of the income and disbursements for the preceding calendar year, one copy of which shall be transmitted to the district treasurer and the other to the council. He shall produce to the council his books and receipts, together with the stubs of the receipts issued by him and the warrants on which he has made disbursements. The

council shall carefully audit these accounts, comparing the statement of income with the duplicate receipts and the statement of disbursements with the warrants. If the amounts are found to be correct they will be attested by the members of the council. Should any member not be in favor of approving them or any item thereof, he will indorse his disapproval in writing thereon, specifying the item or items objected to and the reasons for his objections. A certified copy of the statement, with the signatures thereto and the endorsements thereon, shall be immediately forwarded to the district treasurer, who, if he thinks that judicial proceedings should be begun against either the municipal treasurer or the council, or any member thereof, for the unlawful expenditure of money of the municipality, shall, on behalf of the municipality, through the Attorney for the Moro Province, begin proceedings to recover the same.

SEC. 49. (*a*) During the month of January of each year, the council shall prepare in duplicate a report giving:

(*b*) An inventory of all buildings, lands, and other property, real and personal, belonging to the municipality.

(*c*) An itemized estimate of the revenues of the municipality from all sources during the current year, with a statement opposite each item of the amount realized from that source during the last preceding year.

(*d*) An itemized estimate of the ordinary expenses of the municipality for the current year, with a statement opposite each item of the corresponding expenses for the last preceding year. Estimated ordinary expenses shall not exceed the estimated resources. This estimate shall include a statement of outstanding indebtedness, if such exists.

(*e*) An estimate of such extraordinary expenditures, if any, as may be required through unusual necessity or to make permanent improvements. Such estimate shall state the approximate total expenditures by reason of such necessity or improvement, the amount which it is expected to expend during the year and the source or sources from which it is proposed to secure the necessary funds; also an itemized statement of extraordinary expenditures for the last preceding calendar year. The report hereinbefore provided for shall be in such form as may be prescribed by the district treasurer.

(*f*) Such report, when approved, shall be attested by the president and municipal secretary and shall be forwarded in duplicate to the district treasurer for his action. If the district treasurer shall, upon consideration, find that the taxes levied will produce the estimated revenue and that the actual expenditures provided for in the report will not exceed in the aggregate the estimate thereof, then he shall approve the same and shall forward one of the copies of the report, with his approval endorsed thereon, to the president to serve as a guide to the municipality in the administration of its finances. If, after the district treasurer shall have begun the collection of taxes, he finds that the amount to be actually collected will fall short of the estimate, he shall certify this fact to the council, with a statement of the probable shortage, and it shall be the duty of the council to reduce its subsequent expenditures so as to bring their aggregate within the available income as reported by him.

(*g*) Expenses not provided for in the annual estimate can only be incurred and paid upon authorization by the district treasurer at the request of the municipal council.

SEC. 50. (*a*) All license and privilege taxes shall be paid before the license or tax payer shall begin the business or enjoyment of the privilege for which the license or tax is imposed by the ordinance of the council.

(*b*) All licenses and privilege taxes shall terminate on the thirty-first of December of each year, and anyone beginning a business or exercising a privilege upon which a tax is levied by the council after the thirty-first of December, shall be required, before beginning such business or exercising such privilege, to pay the license or tax for the part of the year which remains to and including the thirty-first of December following. But all licenses and privilege taxes may be paid in advance in four quarterly installments, at the election of the licensee.

(*c*) An addition to every municipal tax or license in the nature of a penalty amounting to twenty per centum of the original tax or license, to be collected and accounted for in the same manner as the original tax or license, shall be imposed for a failure to pay the tax or license when due.

SEC. 51. It shall be the duty of the district treasurer to keep a record, open to public inspection, of the names of all persons paying licenses or privilege taxes, arranged alphabetically.

SEC. 52. Within ten days after the passage of the ordinance by the council for the payment of licenses or privilege taxes, the president and municipal treasurer shall prepare a list of the names of the persons whose business, if continued, would render them liable to the license or tax, and they shall transmit such list at once to the district treasurer, to enable him more readily to detect persons failing to pay the licenses and privilege taxes for which they shall have become liable.

SEC. 53. The council shall provide that any person conducting a business or enjoying a privilege without paying the tax required by its ordinances shall be punished by a fine and imprisonment, after trial and conviction before the president, as in other cases under the limitations prescribed in subsection (*dd*) of section 41.

SEC. 54. Taxes, imposts and all other revenue of the municipality shall not be leased or farmed by the municipal council, but shall be collected by the district treasurer or his authorized deputies, or by the municipal treasurer, as hereinafter provided.

SEC. 55. When collected, the taxes, imposts and other revenues of the municipality shall be turned over by the district treasurer or his deputy, within two weeks of the date of collection, to the municipal treasurer, together with an itemized statement showing the persons from whom such taxes, imposts and revenues have been collected, the respective amount of the same and the nature of the tax, impost or liability, on account of which such amounts have been collected.

SEC. 56. (*a*) In case the district treasurer shall fail to pay over to the municipal treasurer the amount collected by him, or which should have been collected as required by this act, the municipality shall at once proceed, through the Attorney for the Moro Province, by action against the district treasurer upon his official bond, which by law he shall be required to give before entering upon the duties of his office, to recover the amount thus in default.

(*b*) At the termination of the period of collection as fixed by the treasurer of the Moro Province, the district treasurer shall return to the municipal council an account of those taxes that could not be collected and such treasurer will not be held liable for the uncollected portion, unless because of negligence or bad faith on his part or on the part of his deputy or deputies.

(*c*) The proceedings under (*a*) and (*b*) shall not prevent criminal prosecution for such default where the penal code and the circumstances justify it.

SEC. 57. (*a*) It shall be the duty of the district treasurer to be present in the municipality, in person or by deputy, at such times and for such periods as the treasurer of the Moro Province may direct, not less than two times each quarter, prepared to receive payment of all revenues due to the municipality from any source whatever, except fines as provided in section 19, subsection (*h*), fees for the granting of the privilege of fisheries, the issuing of certificates of ownership of large cattle, and of transfer of title to the same, tolls from ferries operated by the municipality, fees from municipal stables, municipal pounds, municipal markets, municipal slaughter houses, municipal bath houses, municipal pail or dry-earth systems, and municipal cemeteries; license fees for theatrical performances, horse races, circuses, cock-pits and cock-fighting, and the training of fighting cocks; which shall be collected by the municipal treasurer in the manner prescribed by ordinance of the municipal council. The district treasurer or his deputy shall give receipts for all municipal funds collected by him, showing the date of each payment, the name of the person making it, the amount of the payment, and on what account it was collected. He shall give notice to the president of the coming of himself or his deputy, one week before the visit of himself or deputy to the municipality, and the president shall cause the same to be posted at the main entrance of the municipal building and in a public and conspicuous place in each barrio. The municipal treasurer shall turn over to the district treasurer or his deputy upon his visit to the municipality, all revenue collected subsequent to the last visit of the treasurer or his deputy, together with his duplicate receipts for the same. The district treasurer or his deputy shall not remove such funds from the municipality, but shall pay them into the municipal treasury before leaving, and they shall thereupon become available for appropriation by the municipal council.

(*b*) The district treasurer or his deputy shall be at liberty at all times to inspect the accounts and receipts of the municipal treasurer, and to count the money in the municipal treasury; and he shall audit the accounts and count the cash at least once during each quarter of the fiscal year. In case an examination shows a defalcation of the municipal treasurer, it shall be the duty of the

district treasurer or his deputy to seize the office and its contents and to notify the Treasurer of the Moro Province forthwith, who shall thereupon, by himself or deputy or by the district treasurer or deputy, at once take possession of the office, the books, papers, vouchers and cash of such municipal treasurer, and shall continue such public business of the office as is necessary until the amount due from the municipal treasurer shall be exactly determined and a correct account stated, when, upon a proper certificate from the Treasurer of the Moro Province, the office and its contents shall be transferred to the municipal treasurer then lawfully entitled. The same procedure shall be pursued in case of the death of the municipal treasurer. Upon the seizure the sureties of the defaulting or deceased treasurer shall at once be notified by the officer making the same. The Treasurer of the Moro Province shall forward to the Attorney of the Moro Province a statement of the account of the defaulting or deceased officer, in order that suit may be brought for any balance which may be due upon the official bond of the defaulting or deceased officer, and in such suit the account stated by the Treasurer of the Moro Province shall be prima facie evidence of the amount due on the bond. In case of a defaulting municipal treasurer criminal proceedings shall be instituted against the defaulter. In case of a deceased municipal treasurer, if no balance is found to be due from him, the Treasurer of the Moro Province shall settle his account and furnish his legal representatives with a certified copy of the settlement.

SEC. 58. It shall be the duty of the municipality to furnish to the district treasurer an office in the municipal building where taxes can be conveniently paid and collected.

SEC. 59. Within thirty days after the municipal tax shall fall due, the municipal treasurer, or the district treasurer or his deputy, as the case may be, shall notify the delinquent taxpayer in writing to appear before him at his office in the municipality within forty-eight hours after the receipt thereof to make payment of the tax and the penalty, and that if he fails to do so his personal property will be summarily distrained and the tax and penalty satisfied out of the proceeds thereof. Such notice shall state specifically the nature or kind of the tax alleged to be delinquent, the period for which it is delinquent and the amount thereof, with the penalty. The notice shall be delivered to the municipal president, who shall cause the same to be served by a member of the municipal police. Service shall be made in the manner prescribed for the service of summons in civil actions by section 396 of the Code of Procedure in Civil Actions and Special Proceedings, and the officer making service shall endorse upon the original notice his return thereof, which shall state the day and hour, the place and the manner of making service, and shall be signed by him; and such return shall constitute *prima facie* proof of service. The original notice with the return endorsed thereon shall be delivered to the official issuing the same, and shall be preserved among the records of his office. After the expiration of forty-eight hours after service of the notice, should the tax payer fail to appear and pay the delinquent tax and penalty, the official who issued the notice shall proceed at once to seize the personal property of such tax payer, and unless redeemed as hereinafter provided, to sell at public auction, either at the main entrance of the municipal building or at the place where such property is seized, as he shall determine, so much of the same as shall satisfy the tax, penalty and costs of seizure and sale to the highest bidder for cash, after due advertisement by notice posted for ten days at the main entrance of the municipal building and at a public and conspicuous place in the barrio where the property was seized, stating the time, place and cause of sale. The original notice of delinquency with the return of service thereon shall be his warrant for his proceeding, and the purchaser at such sale shall acquire an indefeasible title to the property sold. Any surplus resulting from the sale, over and above the tax, penalty and costs, shall be returned to the tax payer on account of whose delinquency the sale has been made. Within two days after the sale the officer making the same shall make a return of his proceedings, which shall be spread upon his record.

SEC. 60. The owner of the personal property seized may redeem the same from the collecting officer at any time after seizure and before sale by tendering to him the amount of the tax, the penalty and the costs incurred up to the time of tender. The costs to be charged in making such seizure and sale shall only embrace the actual expense of seizure and preservation of the property pending the sale, and no charge shall be imposed for the services of the collecting officer or his deputy.

SEC. 61. The assessment of a tax shall constitute a lawful indebtedness from the tax payer to the municipality, which may be enforced by the officer whose duty it is to collect the same as representative of the municipality by civil action in any court of competent jurisdiction, and this remedy shall be in addition to all the other remedies provided by law.

SEC. 62. No court shall entertain any suit assailing the validity of a tax assessed under this act until the tax payer shall have paid, under protest, the taxes assessed against him, nor shall any court declare any tax invalid by reason of irregularities or informalities in the proceedings of the officers charged with the assessment or collection of taxes or of a failure to perform their duties within the time herein specified for their performance, unless such irregularities, informalities or failures shall have impaired the substantial rights of the tax payer; nor shall any court declare any tax assessed under the provisions of this act invalid except upon condition that the tax payer shall pay the just amount of his tax, as determined by the court in the pending proceeding.

SEC. 63. Any officer charged with the duty of listing or collecting any municipal tax who shall willfully omit to list or collect the same or any part thereof shall be guilty of a misdemeanor and punishable by a fine not exceeding one thousand pesos, or imprisonment not exceeding two years, or both, in the discretion of the court.

SEC. 64. Any officer charged with any duty in connection with the assessment or collection of taxes who shall accept a bribe to influence his official action therein, shall be guilty of a misdemeanor and subject to the penalties provided in section 63.

SEC. 65. Any person offering a bribe to an officer charged with any duty in connection with assessing or collecting taxes, for the purpose of influencing his official action, shall be guilty of a misdemeanor and subject to the penalties provided in section 63.

CHAPTER VI.—*Provisional and final sections.*

SEC. 66. The Governor of the Moro Province shall, when in his opinion any municipality is prepared to hold an election, call the first general municipal election in such municipality by executive order. He shall fix therein the date on which the election shall be held, which date shall not be less than eighty days from the date of the executive order and shall fall on the first Tuesday of a month. Except as provided in the section next following such election shall be held in the manner provided in this act for the holding of general municipal elections.

SEC. 67. The proclamation provided for by paragraph (a) of section 9 of this act shall be posted during the first five days of the first of the two months preceding the month in which the election is to be held. The board of election judges shall be appointed by the district governor. The non-elective members of the council shall be appointed in the manner provided in section 14 of this act during the first fifteen days of the month preceding that in which the election is to be held. The officers elected or appointed under this section shall assume the performance of their duties after the election as soon as they have taken the oath of office.

SEC. 68. The term of office of the president, vice-president and councillors elected at the first general election shall be until the first Monday in January following the date of the first succeeding regular general election, or until their successors are duly chosen and qualified. The term of office of the non-elective members of the council shall be until the first Monday in January of the first succeeding year whose final figure is an uneven or odd number, so that thereafter one half of the council shall be chosen annually. The second general municipal election in such municipality shall be held on the first Tuesday of December of the first succeeding year whose final figure is an uneven or odd number. Thereafter general municipal election shall be held biennially as provided in section 9 of this act.

SEC. 69. Pending the first municipal election in any municipality, the president, vice-president and all the municipal councillors shall be appointed by the governor of the district in which the municipality is situated, subject to the approval of the Legislative Council. Officers so appointed shall hold office until the first municipal election shall have been held and their successors duly chosen and qualified, or during the pleasure of the Legislative Council, and shall

have the qualifications required of and shall exercise all the powers hereinbefore conferred upon presidents, vice-presidents and municipal councillors.

SEC. 70. When in his opinion it would be unwise immediately to establish complete and independent municipal government in any municipality, the Governor of the Moro Province may by executive order fix a less or greater number of municipal councillors than herein provided for any municipality, provide that the office of municipal secretary be merged with that of municipal president and that the office of municipal treasurer be merged with that of municipal vice-president, and provide that the powers herein conferred upon municipal officers shall be exercised under the direct supervision and control of the governor of the district until such time as the officers elected at the first general municipal election shall have entered into office, or for such lesser period as he may deem wise.

SEC. 71. Municipal officers now holding office in any municipality of the Moro Province previously organized under the provisions of the Municipal Code shall continue in office until their successors have been appointed in accordance with the provisions of this act.

SEC. 72. Any municipal officer found to be inefficient, or to be guilty of misconduct or of disloyalty to the United States may be removed in accordance with the provisions of section 16 of act No. 787 of the Philippine Commission; but no municipal officer shall be removed from office by the district governor of any district until he has been notified in writing of the charges against him and has been afforded due opportunity to appear with his witnesses and present his defense. Should the Legislative Council deem that public safety demands such a course, it may appoint the successor of any officer so removed; otherwise, the vacancy will be filled as hereinbefore provided in the case of permanent vacancies.

SEC. 73. The Treasurer of Moro Province shall prescribe the method of keeping the ledgers and records of municipal treasurers, and shall prepare such rules and regulations relating to the administration of the affairs of the office as he may deem wise. In order to secure uniformity in all records, accounts, bonds, dockets, warrants, receipts, licenses, and certificates provided for in this act, the municipal treasurer shall purchase the necessary blank books, bonds, dockets, warrants, receipts, certificate and licenses from the Engineer of the Moro Province, who shall furnish them at cost.

SEC. 74. When taxes, the levying of which is not authorized by this act, have been lawfully levied in any municipality organized under any military order, and have been collected in part before organization under this act, the uncollected portion of such taxes for the year 1903 shall be collected and paid into the municipal treasury of the district treasurer or his authorized deputies, anything in this act to the contrary notwithstanding.

SEC. 75. Act No. 82 of the Philippine Commission, entitled "The Municipal Code," and all acts or parts of acts which by their terms amend any section thereof or add any section thereto, except as continued in force by this act, and all laws or parts of laws inconsistent with the provisions of this act, are hereby repealed in their application to the Moro Province. Hereafter acts of the Philippine Commission which by their terms amend any section of said act No. 82, or add any section thereto, shall not apply to the Moro Province unless made applicable thereto by the terms of the act. This section shall not be construed as repealing any provision of general law now in force or which may hereafter be enacted which incidentally imposes any duty or prohibition upon any municipal officer, or creates, circumscribes or enlarges any power or attribute of municipalities for the purposes of giving effect to such general law; but such provisions of general law are hereby expressly continued in effect in the Moro Province.

SEC. 76. The short title of this act shall be "The Municipal Code of the Moro Province."

SEC. 77. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on the twentieth day of February, nineteen hundred and four.

Enacted, January 27, 1904.

Approved by the Philippine Commission April 27, 1904.

[ACT No. 36.]—AN ACT Appropriating the sum of twenty-eight thousand pesos Philippines currency, or so much thereof as may be necessary, for the construction and repair of roads in the Moro Province, the construction of a school house at Davao, and in part payment of a provincial jail at Zamboanga.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums in Philippines currency or so much thereof as may, in each case, be necessary, are hereby appropriated out of any funds in the treasury of the Moro Province not otherwise appropriated, to remain available until expended:

For construction and repair of roads in the Moro Province, to be allotted by the Provincial Engineer with the approval of the Legislative Council, ten thousand pesos.

For the construction of a school house at Davao, three thousand pesos.

For beginning the construction of a provincial jail at Zamboanga, fifteen thousand pesos.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, February 9, 1904.

Approved by the Philippine Commission March 11, 1904.

[ACT No. 37.]—AN ACT Appropriating the sum of six hundred pesos, Philippines currency, or so much thereof as may be necessary, to defray the current expenses of the town of Jolo, district of Sulu, for the month of January, nineteen hundred and four.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The sum of six hundred pesos, Philippines currency, or so much thereof as may be necessary, is hereby appropriated out of any funds in the treasury of the Moro Province not otherwise appropriated, to defray the current expenses of the town of Jolo, District of Sulu, for the month of January, nineteen hundred and four. The said sum shall be expended for the purposes and in the manner and form provided by act No. 28 of the Legislative Council of the Moro Province.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, February 10, 1904.

Approved by the Philippine Commission March 11, 1904.

[ACT No. 39.]—AN ACT Temporarily to provide for the government of the Moros and other non-Christian tribes.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Until the enactment by the Legislative Council of legislation for the creation of local governments among the Moros and other non-Christian tribes, such Moros and other non-Christian tribes shall be governed by the Governor of the Moro Province, through the respective district governors, in the manner and to the extent hereinafter expressly provided in this act.

SEC. 2. It shall be the duty of the district governor of each district to delimit those portions of the district, inhabited by Moros or other non-Christian tribes to such an extent as to render impracticable the extension thereto of municipal government, into tribal wards, having reference when possible to natural objects and boundaries in such manner that a single race or homogeneous division thereof shall occupy as nearly as possible the territory actually occupied by it at present. When different races or tribes or different homogeneous divisions of a single race or tribe occupy contiguous territory, or the territory occupied is in dispute, it shall be the duty of the district governor to invite the headmen or leading representatives of the races, tribes or homogeneous divisions thereof

occupying such contiguous territory, or claiming disputed territory, to a conference in which each headman or representative shall be given opportunity to present such proofs in support of the claims of his people and to urge such objections to the delimitation proposed by the district governor as he may desire. The district governor shall prepare a description of each tribal ward within the district as delimited by him, and, when the same shall have received the approval of the Governor of the Moro Province, shall cause copies thereof, drafted in the language of the races or tribes in interest to be furnished to the headman of each tribal ward within the district. He shall also furnish copies thereof in English to the secretary of the district and the Secretary of the Moro Province, who shall file the same in the records. When any tribal ward shall be wholly or partly within the territorial limits of a municipality organized under the Municipal Code of the Moro Province, it shall be subject, as to the part thereof lying within such municipality, to the provisions of section 2 of said Municipal Code.

SEC. 3. Subject to the approval of the Governor of the Moro Province, the district governor shall appoint as his representative or deputy in each tribal ward a headman, who shall hold office during the pleasure of the Governor of the Moro Province. In making such apointments the district governor shall, when practicable, give preference to the member of the race or tribe at present recognized among his people as their chief or headman. The headman shall exercise the functions of his office under the direct supervision and control of the district governor. He shall be authorized to wear, as a badge of his office, a baldric of red leather having attached thereto a metal disc bearing an impression of the seal of the Moro Province. The Engineer of the Moro Province shall cause to be prepared a sufficient number of such baldrics and discs, and shall distribute them among the governors of the districts, who shall be accountable therefor as for other public property, and who shall in turn distribute them to the headmen, without charge.

SEC. 4. For administrative purposes the headman of each tribal ward shall divide his ward into as many districts as may be directed by the district governor, prescribing for each such boundaries that, taken collectively, they shall include the entire territory of the tribal ward. Subject to the approval of the district governor, he shall appoint as many deputies as there are districts in his ward and shall place each of them in charge of one of such districts. The deputies shall exercise the functions of their office under the direct supervision and control of the headman, and shall hold office during the pleasure of the district governor. They shall be authorized to wear, as a badge of their office, a baldric of yellow canvas or other strong material having attached thereto the metal disc described in the preceding section, to be obtained and distributed in the manner prescribed therein.

SEC. 5. The headman shall be the chief executive of his tribal ward. He shall:

(*a*) Cause the lawful ordinances of the district governor and the laws of the Philippine Islands and of the Moro Province, in so far as they may be applicable to his ward, to be executed therein.

(*b*) Issue orders relating to the police and to public safety, and orders for the purpose of avoiding conflagrations, floods, and the effects of storms or other public calamities.

(*c*) Assist all insular, provincial and district officers in the performance of their official duties within his ward, when so directed by the district governor.

(*d*) Report the commission of crimes and other unusual or untoward events occurring within his ward to the district governor.

(*e*) Through his deputies, keep the people of his ward informed of the ordinances of the district governor and of laws and governmental measures which concern them, in the manner hereinafter provided in section 6 of this act.

(*f*) Be the lawful deputy within his ward of the officer of every court whose jurisdiction extends over the territory occupied by his ward, and shall, when directed by the district governor, execute the lawful orders and process of such courts. He shall receive therefor from his principal the fees provided by law. He shall not be required to give bond to his principal for the proper performance of his duties; but the Moro Province shall be directly responsible for all liabilities arising through his malfeasance or nonfeasance as such deputy.

(*g*) Attend the regular and special meetings of the advisory council hereinafter created, when directed to do so by the district governor.

SEC. 6. The deputies of the headman shall constitute the police force of the

ward, and shall exercise constant police surveillance over their respective districts. They shall immediately inform the headman of the commission of any offense or the occurrence of any unusual or untoward event within their districts. They shall, when directed by the headman, inform the people residing within their districts of any ordinance of the district governor or any law or governmental measure affecting them. To that end each deputy shall by means of criers or messengers call the residents of his district together in public conclave at a convenient hour and place, and cause the ordinance, law or governmental measure to be read aloud in the presence and hearing of the people thus assembled. The deputies shall perform such other duties as the headman shall lawfully direct.

SEC. 7. The district governor of each district may, under the general supervision of the Governor of the Moro Province, issue ordinances having the force of law among the inhabitants of the tribal wards in his district:

(*a*) Prohibiting or regulating the use of firearms, ammunition and edged weapons, and providing for the seizure and confiscation thereof when held or used contrary to law. The provisions of section 24 of act No. 175 of the Philippine Commission, as added by section 4 of act No. 610 and amended by section 1 of act No. 652 of the Philippine Commission, shall not apply to the inhabitants of tribal wards.

(*b*) Prohibiting or regulating the passage of one headman or any of his tribesmen through the tribal ward of another.

(*c*) Establishing fire limits in thickly settled districts, and prescribing the kind of buildings which may be constructed within the same.

(*d*) Providing for the enforcement of the sanitary regulations prescribed by the provincial or district board of health.

(*e*) Establishing or authorizing the establishment of slaughterhouses and markets and providing for the inspection and regulating the use of the same.

(*f*) Providing for the inspection of food products.

(*g*) Prescribing rules and regulations governing the performance of their duties by the ward police.

(*h*) Providing against the evils of gambling, gambling houses, and disorderly houses of whatsoever sort.

(*i*) Restraining riots, fighting, disorderly conduct or disorderly assemblages.

(*j*) Prohibiting or regulating the running at large of domestic animals within the limits of the ward.

(*k*) Prohibiting or regulating cockfighting and the keeping or training of fighting cocks.

(*l*) Prescribing the times and places of meeting of the advisory council hereinafter created, and the manner in which the meetings shall be conducted.

And such other ordinances and regulations, not in excess of the powers conferred upon municipal councils by the Municipal Code of the Moro Province, and not repugnant to law, as may be necessary and proper to provide for the health and safety, promote the prosperity, improve the morals, good order, peace, comfort and convenience of the tribal wards of his district and the inhabitants thereof and for the protection of property therein.

SEC. 8. Ordinances of the district governor shall take effect at the time fixed by him in the ordinance, subject to annulment or amendment by the Legislative Council. It shall be the duty of the district governor to forward a copy of every ordinance to the Secretary of the Moro Province by registered mail immediately after its passage. He shall also forward a copy of such ordinance to the headman of each tribal ward affected by it. Such copy shall be drafted in the language of the tribal ward if such language be a written language, and if not, in any language understood by the headman. A certified copy of each ordinance shall be filed among the records of the district secretary.

SEC. 9. The district governor may, in his discretion, enforce obedience to any ordinance by prescribing therein penalties for its violation; but no single penalty shall exceed a fine of fifty pesos or imprisonment for three months, or both such fine and imprisonment. Trials for the violation of ordinances shall be held before the court which may hereafter be vested with jurisdiction over other offenses committed by the inhabitants of tribal wards in which the penalties may be imposed; and the rules relating to process, pleading, practice, procedure, payment of fines and execution of sentence shall be the same as those provided for such court for the trial of other offenses.

SEC. 10. The headmen of the tribal wards of the district shall constitute an advisory council to the district governor in the exercise of the duties imposed

upon him by this act. When the tribal wards of a district are widely separated by natural boundaries, and those of one part of the district are without interests in common with those of other parts of the district, the district governor shall, for administrative convenience, divide the tribal ward of his district into groups, in which case the headman of the tribal wards of each of such groups shall constitute an independent advisory council. The advisory council of the district, or, in case the district is divided into groups, the advisory council of each group, shall hold regular meetings at least once during each semester, and such special meetings as the district governor may from time to time direct. The advisory council shall confer with the district governor upon matters of public concern, and the members may propose to the district governor such measures affecting the interest of their tribal wards as they may desire. At such meetings it shall be the special duty of the district governor to explain to the headmen assembled the purpose of the United States to establish among them a just, stable and sovereign government in which they shall be afforded the opportunity to manage their own local affairs to the fullest extent of which they are capable consistent with the maintenance of law, order and loyalty, and in which the exercise of their customs and religion will not be interfered with unless contrary to law or repugnant to the usages of civilized nations, to explain to them the advantages of civilized municipal government, and to endeavor to awaken and foster an interest in the construction and maintenance of buildings, school houses, roads, trails and other public works for the common use and benefit of the inhabitants of their respective districts.

SEC. 11. The advisory council of the district or of any group of tribal wards, may by a majority vote of all the headmen and with the approval of the district governor, by resolution provide:

(*a*) That the cedula or registration tax shall become due and payable among the inhabitants of the tribal wards of the district or group at any time prior to the time fixed therefor by section 8 of act No. 5 of the Legislative Council.

(*b*) That the system of taxation provided in the following section shall be put in force in the tribal wards of the district or group and levied, collected and disbursed in the manner provided by this act.

Upon the passage of such a resolution it shall be reduced to writing by the district governor and in his presence interpreted to each of the members present. It shall then be signed by the headmen voting in favor thereof in the presence of the district governor, the latter signing for those who are unable to do so. The district governor shall certify in writing on the resolution that the required formalities have been complied with and his approval of the resolution, and shall forward a certified copy thereof by registered mail to the Secretary of the Moro Province. The original resolution shall be filed among the records of the district secretary.

SEC. 12. Taxation shall be uniform in each district or group of tribal wards. The revenues of the tribal ward shall be derived from the following taxes only, which shall be put into effect within the tribal ward at such time as the Legislative Council of the Moro Province shall approve the resolution mentioned in the preceding section:

(*a*) Licenses for the privilege of fishing by use of nets, twenty-five centavos per annum for each square meter or part of a square meter of surface, to be levied on the net and assessed against the owner. *Provided*, that it shall not be necessary to procure such license to fish when the surface measure of the net is less than ten square meters.

(*b*) Licenses for the privilege of fishing by means of traps or corrals, one peso per annum for each lineal ten meters or part of ten meters of wall or fencing used in the construction of the trap or corral, measured horizontally along the surface of the water, except traps or corrals the total lineal horizontal measurement of which is less than ten meters, to be levied on the corral or trap and assessed against the owner.

No tribal ward license shall be granted for the privilege of pearl or shell fishing.

(*c*) Licenses for the use of public markets which may be authorized by the district governor, the license to be fixed in each case by the district governor and the headman of the tribal ward, and approved by the Treasurer of the Moro Province.

(*d*) Licenses for the privilege of establishing and maintaining such ferries as may be authorized by the district governor, twenty-five centavos per annum for each one passenger capacity, and fifty centavos per annum in addition for each

one large cattle capacity of each boat or vessel employed. *Provided*, that the fees to be charged the public by the licensee shall be regulated by the district governor.

(*e*) Licenses for the privilege of establishing and maintaining such slaughterhouses as may be authorized by the district governor, the license to be fixed by the district governor and the headman of the tribal ward and approved by the Treasurer of the Moro Province in each case. *Provided*, that the district governor shall regulate the fees to be charged the public by the licensee.

(*f*) Licenses for the privilege of establishing and maintaining such cockpits as may be authorized by the district governor, one hundred pesos per annum for each cockpit, the license to be fixed by the district governor and approved by the Treasurer of the Moro Province in each case.

(*g*) A tax of fifty centavos per annum upon each male dog and one peso per annum upon each bitch, to be assessed against the owner thereof.

(*h*) A tax of one peso per annum on each firearm or edged weapon, the use or possession of which shall have been authorized by the district governor, except tools for working purposes having blades less than fifteen inches in length. The tax shall be collected by the district treasurer by affixing, in the presence of the district governor or his authorized deputy, on the permit for each firearm or edged weapon an internal revenue stamp of the face value of one peso, Philippines currency, without which such permit shall not be valid.

(*i*) An annual personal tax of ten pesos upon each able-bodied male resident of the tribal ward between the ages of eighteen and fifty years. *Provided*, that every such resident who shall show to the satisfaction of the district treasurer that during the year preceding the date upon which the tax shall fall due he has been engaged in any lawful work, trade, occupation or profession to such an extent as to have provided a decent and sufficient livelihood for himself and the persons dependent upon him, shall be exempted from the payment of the tax. The district governor shall by ordinance provide for the working out of this tax by persons delinquent in the payment thereof after due trial and conviction for vagrancy by the proper court, on local public works in the tribal ward, under the supervision of the headman, at a rate of not less than fifty centavos for each day of labor.

(*j*) An addition to each tax or license specified in this section, in the nature of a penalty amounting to twenty per centum of the original tax or license, to be collected and accounted for in the same manner as the original tax or license, shall be imposed for a failure to pay the tax or license when due.

SEC. 13. Taxes and other revenues of the tribal ward shall not be leased or farmed, but shall in every instance be collected by the district treasurer or his authorized deputies. The provisions of the Municipal Code of the Moro Province relative to the assessment, collection and enforcement of municipal taxes shall apply to the assessment, collection and enforcement of the taxes provided by section 12; but the Treasurer of the Moro Province may, in his discretion, issue special rules and regulations having the force of law to be followed by the district treasurers and their deputies in cases arising in which the said provisions of the Municipal Code of the Moro Province are, owing to the peculiar conditions existing in any tribal ward impossible or difficult of application.

SEC. 14. The gross proceeds resulting from the collection of the taxes provided by section 12 shall be covered into the treasury of the Moro Province and shall constitute a special fund to be expended exclusively in the payment of the salaries of the officers of the tribal ward in which collected and for such other local public purposes of such ward as the Legislative Council of the Moro Province may, from time to time direct.

SEC. 15. For convenience in the assessment, collection and enforcement within tribal wards of the cedula, internal revenue and other general taxes from the payment of which the inhabitants of such ward are not exempted by law, the Treasurer of the Moro Province may, in his discretion, issue special rules and regulations having the force of law, which shall be followed by the district treasurers and their deputies, when the general provisions of law governing such assessments, collections and enforcements are, owing to the peculiar or unusual conditions existing in any tribal ward, impossible or difficult of application. The Treasurer of the Moro Province may authorize the headman to collect the cedula tax within his tribal ward as the agent or deputy of the district treasurer, under such restrictions as to the giving of bond or otherwise as he may deem necessary to secure the faithful performance of his duties by such headman, and may authorize the payment to the headman for such collection of a commission of not to exceed five per centum of the amount collected.

SEC. 16. The headman of each tribal ward shall receive an annual salary of not less than two hundred and forty nor more than eighteen hundred pesos Philippines currency, and each deputy of a headman shall receive an annual salary of not less than ninety-six nor more than six hundred pesos, to be fixed in each case by the Legislative Council of the Moro Province, and to be paid from the special fund created by section 14 of this act. *Provided*, that no headman or any of his deputies shall be entitled to receive any salary for his services as such headman or deputy until it shall be made to appear to the satisfaction of the Legislative Council by the Treasurer of the Moro Province that the taxes authorized by section 12 of this act, as well as the cedula or registration tax, the internal revenue taxes, and all other general taxes from the payment of which the inhabitants of tribal wards are not exempted by law, are enforced and collected within the tribal ward of such headman by the district treasurer or his authorized deputies without opposition or hindrance from the inhabitants thereof and with the active aid and cooperation of such headman and his deputies.

SEC. 17. The district governor shall keep the Governor of the Moro Province continually informed as to the progress and working of the government created by this act among the inhabitants of the tribal wards of their respective districts. The Governor of the Moro Province shall, from time to time, make report thereon to the Legislative Council recommending such measures as he may deem conducive to the general welfare and prosperity of the inhabitants of the tribal wards of the Moro Province.

SEC. 18. It shall be the constant aim of the Governor of the Moro Province and of the district governors to aid the inhabitants of the several tribal wards to acquire the knowledge and experience necessary for local popular government and the exercise of the powers of supervision and control conferred upon them by this act shall be confined within the narrowest limits consistent with the requirement that the powers of government in the various tribal wards shall be honestly and effectively exercised, and that law and order and individual freedom shall be maintained. They shall in every case, if possible, in exercising such powers respect and conform to the local customs of the inhabitants of the various tribal wards, unless such customs are contrary to law or repugnant to the usages or moral sense of civilized peoples.

SEC. 19. Questions which may arise relative to the constitution or attributes of the government created by this act shall be submitted to the Attorney for the Moro Province for opinion.

SEC. 20. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, February 19, 1904.

Approved by the Philippine Commission March 11, 1904.

[ACT No. 38.]—AN ACT Providing for the organization and government of the municipalities of Jolo, Siassi, and Cagayan de Sulu.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. All that portion of the Island of Jolo comprised within the limits below described, including all wharves and buildings adjacent to the shore line shall constitute the Municipality of Jolo:

Beginning at the point M, which is on the shore and 3,091.2 feet from, and bears north 38 degrees 30′ east from the nearest angle of the wall, thence south 65 degrees 30′ east a distance of 7,733 feet to the point N, thence south 29 degrees west a distance of 8,730 feet to the point O, thence north 42 degrees west a distance of 10,633 feet to the point P, upon the shore line, thence meandering along the shore line a distance of approximately 7,577 feet to the point of beginning, all bearings being true bearings, and all distances and bearings being scaled from a map on file in the office of the Secretary of the Moro Province.

SEC. 2. All that portion of the Island of Siassi included within a circle of one mile radius, whose center is at the middle point of the shore or inner end of the timber portion of the public wharf, shall constitute the municipality of Siassi.

SEC. 3. The entire Island of Cagayan de Sulu and its dependencies shall constitute the municipality of Cagayan de Sulu.

SEC. 4. The municipalities of Jolo, Siassi and Cagayan de Sulu shall be recognized as municipal corporations. They may sue and be sued, contract and be contracted with, and acquire and hold real and personal property for the general interests of the municipality. All property and property rights vested in any of said municipalities under its former organization shall continue to be vested in the same municipality after its incorporation under this act. They shall be subject to and governed by the following provisions of the Municipal Code of the Moro Province: Section 17; section 18; subsections (*a*), (*b*), (*c*), (*d*), (*e*), (*f*), (*g*), (*h*), (*j*), (*n*), and (*o*) of section 19; subsections (*a*) and (*d*) of section 20; section 21; section 22; section 30; section 31; section 32; subsection (*a*) of section 33; section 35; section 36; subsection (*b*) of section 39; section 40; section 41; except subsection (*b*) thereof; section 42, except subsection (*a*) thereof; section 43; chapter V and section 73.

SEC. 5. In each of the municipalities of Jolo, Siassi and Cagayan de Sulu there shall be a president, a vice-president, a secretary, two councillors and a treasurer, all of whom shall be appointed by the Governor of the District of Sulu and hold office during his pleasure, except the treasurer as to whose appointment, removal, qualifications, salary and duties the provisions of subsection (*l*) of section 19 and subsection (*a*) of section 23 of the Municipal Code of the Moro Province shall apply. All other municipal officers and employees authorized by the municipal council shall be appointed and may be suspended, reinstated or removed by the president, subject in every instance to the approval of the District Governor. The president, vice-president, secretary and councillors and their lieutenants shall receive no compensation.

SEC. 6. The municipal council shall divide the municipality into two districts, which taken collectively shall include the entire territory of the municipality and shall place each of such districts under the direction and administrative control of one of the councillors. For convenience in administration the districts may be subdivided into barrios.

SEC. 7. The president, vice-president, secretary and councillors shall constitute the municipal council, and each member shall have a right to vote therein. The president, and in his absence the vice-president, shall be the presiding officer of the council.

SEC. 8. In cases of the violation of municipal ordinances within the limits of the municipality the process of the president while sitting as a municipal court at the trial thereof shall run through all that part of the district of Sulu not included in other municipalities.

SEC. 9. Every municipal officer and employee shall exercise the powers conferred upon him under the direct supervision and control of the District Governor.

SEC. 10. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, February 11, 1904.

Approved by the Philippine Commission March 11, 1904.

[ACT No. 40.]—AN ACT Empowering the governor of the Moro Province to offer a reward of any sum not exceeding one thousand pesos, Philippines currency, for information leading to the arrest and conviction of the perpetrators of crime in the Moro Province.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The Governor of the Moro Province is hereby empowered to offer a reward of any sum not exceeding one thousand pesos, Philippines currency, for information leading to the arrest and conviction of the perpetrator or perpetrators of any crime in the Moro Province, or for information leading to the recapture of any convict escaped from any prison in the Moro Province; and to incur the expense of properly advertising the same.

SEC. 2. Claims for rewards shall be presented in writing to the Governor of the Moro Province within thirty days after the conviction or the recapture, as the case may be. They shall be supported by the affidavits of the claimant, the arresting officer and the prosecuting officer, when the reward claimed is for information leading to arrest and conviction, and by the affidavits of the claimant and the arresting officer, when the reward claimed is for information lead-

ing to recapture, and in every case by such further affidavits and proofs as the Governor of the Moro Province may require. The Governor of the Moro Province shall decide to what persons and in what respective proportions the reward shall be paid; and his decision shall be final. Whenever there are two or more claimants to a reward, each of whom has furnished a portion of the information desired, or whenever one or more claimants have furnished the information leading to the arrest, and one or more other claimants have furnished the information leading to the conviction of the perpetrator or perpetrators of a crime, the reward shall be equitably distributed among the several claimants in proportion to the importance of the information furnished by each.

SEC. 3. Rewards and the expenses incurred in advertising the same shall be paid out of the Treasury of the Moro Province upon appropriation duly made.

SEC. 4. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, February 23, 1904.

Approved by the Philippine Commission March 11, 1904.

[ACT No. 41.]—AN ACT Authorizing the governor of the Moro Province to designate not to exceed five civil service employees of the province to aid in the translation of public laws, and providing for the payment of an overtime wage to such employees.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The Governor of the Moro Province is hereby authorized to designate not to exceed five civil service employees of the province to aid in the translation of public laws and other governmental measures, outside of their regular office hours. Such employees shall receive an overtime wage, to be fixed by the Governor of the Moro Province, of not to exceed seventy-five cents, currency of the United States, for each hour of overtime service, the provisions of act No. 148 of the Philippine Commission to the contrary notwithstanding. They shall perform their duties under the supervision of the Attorney for the Moro Province at such times as he shall appoint.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, February 29, 1904.

Approved by the Philippine Commission April 4, 1904.

[ACT No. 42.]—An act to provide for the levy, assessment and collection of an ad valorem tax on land.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. There is hereby imposed upon all land in the Moro Province, except land belonging to the United States of America, the Central Government of the Philippine Islands, the Government of the Moro Province or any district or municipality thereof, and land situated within any tribal ward and owned by an inhabitant thereof, a uniform ad valorem tax, which shall be known as the land tax, of seven eighths of one per centum of the value of such land as assessed in accordance with law. For the purpose of this act the word "land" shall be construed to include improvements thereon, buildings and other constructions annexed to the soil, and, in general, all corporeal property actually or constructively annexed to land or buildings whether for the purpose of carrying on a trade or otherwise.

SEC. 2. Whenever the entire value of land, as defined in the preceding section, belonging to a single owner within any one district or subdistrict of the Moro Province shall not exceed the sum of fifty pesos, Philippines currency, the land tax shall not be assessed or collected upon such land. There shall also be exempted from taxation burying grounds, churches and their adjacent parsonages or *convenos*, and lands and buildings used exclusively for religious, charitable, scientific or educational purposes, and not for private profit: but such exemption shall not extend to lands or buildings held for investment,

though the income therefrom be devoted to religious, charitable, scientific or educational purposes. *Provided, however*, that all land exempted from the payment of the land tax by this section, shall be listed and valued as for taxation by the board of assessors as in the case of land not exempted therefrom.

SEC. 3. The land tax shall be levied against the owner or owners of the land, or, in case of doubt or dispute as to the ownership, against the person or persons actually in possession thereof. Should the property in the soil and the property in the buildings, improvements or fixtures thereon be vested in different persons, the tax shall be levied against all of such persons in proportion to the value of the property respectively owned by each. Whenever, after a proper investigation by the board of assessors, the owner or owners of land subject to taxation can not be discovered, the tax shall be levied against the unknown owner thereof. The tax shall be imposed upon the person against whom it shall be first lawfully assessed during the continuance in force of the general assessment, irrespective of prior or subsequent changes of ownership or possession, unless the interested parties shall cause a copy of the instrument of conveyance to be filed with the treasurer of the district to enable him to enter the necessary amendments on the tax list. *Provided, however*, that in every case the person against whom the tax shall be lawfully assessed on the day on which the lien for the taxes of any year attaches to the land shall remain liable for the payment of the tax of that year.

SEC. 4. Land situated within the limits of a municipality, and subject to the land tax, shall be listed, valued and assessed for taxation by a board, which shall be known as the municipal board of assessors, consisting of the municipal president, the municipal treasurer and a specially authorized deputy of the treasurer of the district. Land situated without the limits of a municipality, and subject to taxation, shall be listed, valued and assessed for taxation by the board of assessors of the most conveniently situated municipality when directed to do so by the treasurer of the district. The president of the municipality shall be the president of the board of assessors, and the municipal secretary shall be its secretary. The place of meeting of the board, except when viewing the land to be valued, shall be the office of the municipal secretary. All questions presented to the board for its determination shall be decided by a majority vote.

SEC. 5. Before entering upon their duties and the organization of the board, the members shall take and subscribe an oath before the municipal secretary, who is hereby given authority to take oaths for this purpose, in the following words:

Moro Province, District of ———.

Municipality of ———.

I, ——— ———, do solemnly swear (or affirm) that I will appraise all land subject to taxation in the municipality of ———, or in such other place or places as may be directed by the treasurer of the district of ———, so far as required by law, at its full true value in money, and will set the same in the tax list of said municipality at its true value in money, and will faithfully discharge all the duties imposed upon me by law. So help me God. (In case of affirmation the words "So help me God" should be stricken out.)

——— ———.

(Signature of the assessor.)

Sworn and subscribed to before me this —— day of ———, 190—.

——— ———.

(Signature of the municipal secretary.)

Such oath, when subscribed, shall be filed with the municipal secretary, who shall record the entire oath and certificate upon the records of the board.

SEC. 6. It shall be the duty of every owner of land not exempted from taxation by the provisions of section 1 of this act to prepare, or cause to be prepared, a statement of the amount of land, as defined in said section, which he owns, its present market value in Philippines currency, and a description sufficient in detail to enable the board of assessors to identify the same on examination. The basis of valuation on such land shall be its market value on the date on which the statement is made. He, or his duly authorized agent, in case it is impossible for the owner to appear in person, shall subscribe the statement and verify the same on oath before the municipal secretary of the municipality in which the land is situated, or if situated without the limits of a municipality, before the secretary of the municipality nearest or most convenient thereto. If

the owner of the land is not a resident of the municipality in which the land is situated or which is nearest or most convenient to the land when situated without the limits of a municipality, the statement will be sufficient if sworn and subscribed to before an officer authorized to take oaths in the municipality of which the owner is a resident. The statement shall be filed with the secretary of the board within two weeks after the organization of the board. It shall be the duty of the owner of buildings, improvements or fixtures erected or affixed to land after the assessment of the same to cause a statement covering such buildings, improvements or fixtures to be filed with the municipal secretary at least two weeks before the first yearly meeting of the municipal board of assessors thereafter. It shall be the duty of the secretary of the board to make immediate report to the treasurer of the district of the filing by any person of sworn statements relating to land situated without the limits of the municipality.

SEC. 7. On the first day of April, nineteen hundred and four, the board of assessors shall meet, take the oath of office and organize, and shall proceed to make a list of all land in the municipality, not exempted from taxation by the provisions of section 1 of this act, by barrios, and a separate list of the land situated without the limits of the municipality which it may be directed by the treasurer of the district to list, value and assess for taxation. The names of the owners in each barrio shall be arranged alphabetically, according to surnames, with a brief description opposite to their names of the land owned by them. In making this list the board of assessors shall take into consideration the sworn statement of the owners of the land, hereinbefore required to be filed, as to the ownership, amount, and value of such land; but it shall be its duty in each case to investigate all such evidence as may be obtainable on the subject. For this purpose the board is authorized to summon witnesses, administer oaths to them, and subject them to examination concerning the ownership, amount and value of land in each barrio or locality, and, in its discretion, to visit any land as to whose ownership, amount or value there exists any doubt, in a body or by committee, in order to make personal investigation of the facts. It shall be the duty of the board, so far as is necessary, to examine the records of the registry of property showing the ownership of land in the municipality or locality.

SEC. 8. The board of assessors shall include in the list the land of owners who are unknown, absent or have failed or neglected to present the sworn statement required by section 6, describing with sufficient accuracy the property thus listed, and including in the entry a statement that the owner is unknown, or if known, a statement of his absence, or neglect or failure to present the required statement, and his present postoffice address.

SEC. 9. After having completed the list, the board shall proceed to assess the value of each parcel of land, and the buildings, improvements or fixtures thereon, if any, separately at its or their true present market value stated in terms of Philippines currency. Where it shall appear that there are separate owners of the soil, the buildings, the improvements or the fixtures, a separate assessment of the property of each shall be made. The values so fixed shall be placed upon the tax list opposite the names of the owners and the description of the property taxed.

SEC. 10. The board of assessors shall complete their listing and valuation of land on or before the 30th day of May, 1904, and, when completed, shall authenticate the same by signing the following certificate at the foot of the list: "We hereby certify that the foregoing list contains a true statement of the aggregate amount of the taxable real estate belonging to each person named in the list, according to the best of our knowledge and belief." In succeeding years the listing and valuation of land brought before the board in accordance with the provisions of section 14 of this act shall be completed within a period to be fixed by the Treasurer of the Moro Province.

SEC. 11. When the list shall be completed in accordance with the foregoing section, it shall be filed in the office of the secretary of the board, and the board of assessors shall, by notice posted in a public and conspicuous place in each barrio of the municipality, in each locality without the limits of the municipality where land listed and assessed by it is situated, and at the main entrance of the municipal building, inform the public that the list has been completed and is on file in the office of the secretary of the board and may be examined by any person interested therein; and that during a period of thirty days for the year nineteen hundred and four and five days for succeeding years, to commence on a day at least ten days after the posting of said notice, the board will be in session for the purpose of hearing complaints as to the accuracy of the listing of

the property and the valuation thereof as assessed for taxation. After such notices have been posted the secretary shall certify to the fact of posting upon the records, which shall be deemed *prima facie* evidence thereof. During the period fixed in the posted notice the board shall hold daily sessions, except on public holidays, for the purpose of hearing all complaints then or theretofore filed by persons against whom taxes have been assessed as owners of land, and shall make and enter in each case a decision on its minutes. If the board shall determine that injustice has been done or errors have been committed, it shall have authority to amend the list in accordance with its findings.

SEC. 12. In case any complainant before the board of assessors shall feel aggrieved by its decision, either as to land assessed for taxation against himself or as to land assessed against others, he may, within ten days after the entry of the decision upon the minutes, appeal to the district board of revision hereinafter established. He shall perfect his appeal by filing a written notice of the same with the board of assessors.

SEC. 13. Tax lists shall be prepared in duplicate. Upon the expiration of a period of ten days after the expiration of the period provided in the preceding section for the hearing of complaints, it shall be the duty of the secretary of the board of assessors to forward one of such duplicates and a certified copy of all the proceedings of the board, including proceedings had upon complaints made, to the treasurer of the district. The remaining duplicate and the original record of the proceedings of the board shall be filed in the office of the municipal secretary.

SEC. 14. The board of assessors shall meet, after ten days' notice posted at the main entrance of the municipal building, in a public and conspicuous place in each barrio of the municipality, and in localities without the limits of the municipality where land subject to listing and assessment by it is situated, for such number of days as shall be fixed by the Treasurer of the Moro Province, in the month of December of each year, to add to the list of land the value of the buildings, improvements or fixtures placed on any property during the year preceding, and to reduce the assessments against any taxpayer whose buildings, improvements or fixtures, already assessed, have been destroyed or have appreciably depreciated in value, or whose land, already assessed, shall have suffered a permanent loss of value by reason of flood, storm or other casualty, during the preceding year. If it shall be discovered by the board or brought to its attention, or to the attention of any member thereof, that any taxable land in the municipality or locality has escaped listing, it shall be the duty of the board at once to list and value the same and charge against the owner thereof the taxes due for the current year and for all other years since the original assessment under this act was made by the board, and the taxes thus assessed shall be legal and collectible by all the remedies herein provided, and penalties and interest shall be added to the back taxes as if the same had been assessed at the time when they should have been assessed.

SEC. 15. The assessment first made under the provisions of this act shall continue in force for a period of five years, unless an earlier provision is made by law for another general assessment.

SEC. 16. No member of a board of assessors shall sit in the consideration of the assessment of property in which he or any member of his family, or any relative within the fourth degree of consanguinity or affinity shall have an interest. In cases where any member or members of the board shall be disqualified to act by reason of this section, the remaining member or members of the board shall be authorized to act as a full board.

SEC. 17. The board of assessors shall perform its duties under the general supervision and control of the treasurer of the district, whose duty it shall be to exercise constant surveillance over the performance of its duties by the board to the end that its services may be performed with the highest degree, of economy, speed and efficiency possible.

SEC. 18. There shall be paid from provincial funds to the municipal president and the specially authorized deputy of the treasurer of the district, while sitting as members of the board of assesors, for each day's session of the board, from the date of its organization each year until the expiration of the period fixed for hearing complaints, upon which they are in actual attendance for at least six hours, the sum of two pesos, Philippines currency. The municipal secretary shall receive two pesos, Philippines currency, per day, except Sundays and holidays, irrespective of the hours worked, from the date

of the organization of the board each year until the expiration of the time fixed for hearing complaints. The municipal treasurer shall receive no extra compensation for his services as member of such board. No payment shall be made to any member of the board until the completed tax list shall have been forwarded to the treasurer of the district and the latter shall have certified that the services of the members of the board have been faithfully performed and that the amount claimed by each are just and correct.

SEC. 19. The district board of each district shall constitute a permanent district board of revision, and shall exercise the powers conferred upon it by this act. The governor of the district shall be the chairman of the board of revision, and the secretary of the district shall be secretary and keep the record of the proceedings. The place of meeting of the board, except when viewing the land to be valued, shall be the office of the secretary of the district. All questions presented to the board for its determination shall be decided by a majority vote.

SEC. 20. Before organizing as such, the members of the district board of revision shall take and subscribe the following oath before any officer authorized to administer oaths:

Moro Province, District of ———

Municipality of ———

I, ——— ———, do solemnly swear (or affirm) that I will well and truly revise the assessments and valuations of land made by the municipal boards of assessors of the district of ———, assess new buildings, improvements and fixtures thereon not before assessed, and assess all land subject to assessment that has not hithero been assessed, all according to their true value in Philippines currency; that I will well and truly hear and determine all matters and issues between taxpayers and municipal boards of assessors submitted for my decision, and that I will faithfully discharge all the duties imposed upon me by law. So help me God. (In case of affirmation, the words "So help me God" should be stricken out.)

(Signature of the member of the district board of revision.)

Sworn and subscribed to before me, this —— day of ——— 190—.

(Signature of officer administering oath.)

The oath of each member shall be filed by the secretary with the record of the proceedings of the board.

SEC. 21. The district board of revision shall be in continuous session for a period of fifty days, commencing on the twentieth day of July, 1904, and in succeeding years for a period of ten days, commencing on the fifteenth day of January of each year, and shall hold such number of meetings, daily or otherwise, as the proper performance of the duties imposed upon it by this act may require.

SEC. 22. It shall be the duty of the board of revision to hear and decide all appeals from the decisions of municipal boards of assessors duly transmitted to it. It may also, when it shall be made to appear to it that any taxpayer against whom land has been assessed for taxation, has, through ignorance of the methods to be pursued, inexperience of the members of the board of assessors, or lack of actual notice, failed to present his claim against the listing, assessment or valuation of such land, or has failed to perfect an appeal from the decision of the board of assessors, within the time required by law, hear and decide the complaints of such taxpayer in the same manner as though the matter had come regularly before it on appeal.

SEC. 23. The board of revision shall carefully investigate all cases in which it shall be alleged or in which it shall have reason to believe that the valuation placed upon any parcel of land by the board of assessors is less than the true value thereof, and shall list and assess for taxation all land subject to assessment which may be brought to its attention, which has escaped assessment.

SEC. 24. The board of revision shall hear and investigate all complaints which may be presented to it in regard to the general valuation placed upon the property of any municipality, barrio or locality by the board of assessors. If the board, on hearing, shall determine that the general valuations in any municipality, barrio or locality are excessive, it may make a pro rata reduction of such valuations so that they shall be just and fair and make an equality between the municipality, barrio or locality in question and other municipalities, barrios or localities of the district in which the general market value of land is the same, or nearly so. Should the board determine that the general valuations in any municipality, barrio or locality are less than the true general

market values, it shall increase such valuations pro rata so that they shall be just and fair valuations and make an equality between the municipality, barrio or locality in question and other municipalities, barrios or localities of the district in which the general market value of land is the same, or nearly so. Before the general valuation of the land of any municipality shall be increased or decreased, the municipal council, by its president, or its representative duly authorized for that purpose, shall be entitled to be heard upon the question of such increase or reduction.

SEC. 25. The board of revision shall investigate and decide what land is exempted from taxation under the provisions of sections 1 and 2 of this act, and shall cause the word EXEMPT with the signature of the secretary of the board to be stamped opposite each entry of land so exempt on the revised tax list, if the same shall have been assessed. The treasurer of the districts and his deputies in making collections of the land tax shall be governed as to exempted property by the decision of the board of revision, so expressed.

SEC. 26. The board of revision shall, in accordance with law, fix the just value, expressed in terms of Philippines currency, of all land which shall be brought before it for consideration in the manner in this act provided. When the revision of the assessed value of all land in the district shall have been completed by the board in accordance with the provisions of this act the members of such board shall, on or before the twentieth day of September, 1904, and on or before the twentieth day of January of each succeeding year, certify over their signatures a list of the changes made by them in the previous assessments, together with a list of the total assessments for the current year in each municipality and the localities attached to it for purposes of assessment, in duplicate, and transmit the same, together with a certified copy of the record of the proceedings of the board to the treasurer of the district. The original record of the proceedings of the board shall be filed among the records of the secretary of the district. One of the duplicates of the list of changes and the list of total assessments shall be forwarded by the treasurer of the district to the secretary of the municipality to which the same refers, who shall file the same among the records of his office. The remaining duplicates shall remain in the office of the treasurer of the district, who shall thereafter in making his collections be governed thereby. The revised tax lists of the general assessment of the year nineteen hundred and four and the revised tax lists of the succeeding years covering the property newly assessed in such years shall constitute the lawful assessment of land until another general assessment shall be provided by law.

SEC. 27. Each district board of revision shall perform its duties under the general supervision of the Treasurer of the Moro Province. To enable it to carry out the powers conferred upon it, the board is authorized to summon witnesses, administer oaths to them, and subject them to examination concerning the ownership, amount and value of land in question, and, in its discretion, to visit such land in a body or by committee, to make personal investigation of the facts. Members of the district board shall receive no extra compensation for services performed as members of the district board of revision.

SEC. 28. The land tax for the year nineteen hundred and four shall be payable at such times within the three months ending on the thirteenth day of December of said year, and in succeeding years at such times within the three months ending on the thirty-first of May of each year, as shall be fixed by the treasurer of the district by proclamation posted at the main entrance of the municipal building and also at a public and conspicuous place in each barrio or locality without the limits of the municipality in which lands subject to tax are situated. The tax shall be due and payable at the office of the treasurer of the district or his deputy in the municipality, and shall be collected by him or his deputy on every day except public holidays during the usual business hours for the collection period, which shall not be less than one week and shall be described in said proclamation by fixing the opening and closing days. A failure to pay the tax within the period specified shall subject the delinquent taxpayer the first month after the same shall become delinquent to the penalty of an additional five per centum of the original tax due, the second month after the same shall become delinquent to the penalty of an additional ten per centum of the original tax due, and thereafter to the penalty of an additional fifteen per centum of the original tax due, to be collected at the same time and in the same manner as the original tax, and the proclamation shall so announce. The penalty shall be accounted for in the same manner as the tax. The district treasurer shall fix the time of collection in the municipality with a view to economy

in the administration and discharge of his duties, and the convenience of the taxpayers of the municipality.

SEC. 29. Within six months after the tax shall become delinquent the district treasurer or his deputy shall prepare and sign a certified copy of the records of his office, showing the persons delinquent in the payment of their taxes, the amounts of tax and penalty respectively due from them, and a description of the land upon which the tax assessed is due. He shall as soon as practicable after the preparation of such delinquent list, proceed to seize the personal property of each delinquent, and, unless redeemed as hereinafter provided, to sell at public auction, either at the main entrance of the municipal building, or at the place where such property is seized, as he shall determine, so much of the same as shall satisfy the tax, penalty and costs of seizure and sale, to the highest bidder for cash, after due advertisement by notice posted for ten days at the main entrance of the municipal building and at a public and conspicuous place in the barrio or locality where the property was seized, stating the time, place, and cause of sale. The certified copy of the record of delinquents shall be his warrant for his proceedings, and the purchaser at such sale shall acquire an indefeasible title to the property sold. As soon as practicable after the sale, the treasurer or his deputy shall make return of his proceedings and spread it upon his records. Any surplus from the sale, over and above the tax, penalty, interests and cost, shall be returned to the taxpayer on account of whose delinquency the sale has been made.

SEC. 30. The owner of the personal property seized may redeem the same from the collecting officer at any time after seizure and before sale by tendering to him the amount of the tax, penalty, interest and the costs incurred up to the time of tender. The costs to be charged in making such seizure and sale shall only embrace the actual expense of seizure and preservation of the property pending the sale, and no charge shall be imposed for the services of the collecting officer or his deputy.

SEC. 31. Except as otherwise provided in the land registration act, taxes and penalties assessed against realty shall constitute a lien thereon, which lien shall be superior to all other liens, mortgages or incumbrances of any kind whatsoever, shall be enforceable against the property whether in the possession of the delinquent or any subsequent owner, and can only be removed by the payment of the tax and penalty, with interest on both at the rate of six per centum per annum from the date of the delinquency. Taxes assessed against land, and collectible within the three months ending on the thirty-first day of May of each year, shall be held to be taxes for that year, and the lien for the taxes and penalties assessed against land shall attach to the land from the first day of January preceding the thirty-first day of May upon which the taxes shall become delinquent. The lien for the taxes and penalties assessed against land for the year nineteen hundred and four shall attach to the land from the first day of April of said year.

SEC. 32. In the event that the treasurer of the district or his deputy shall be unable to find sufficient personal property of the delinquent out of which to collect all the taxes assessed against him upon his land, or, if the delinquent be unknown, the treasurer of the district or his deputy shall, upon the warrant of the certified record required in section 29, as soon as practicable after the delinquency, advertise the land of the delinquent for sale, or so much thereof as may be necessary to satisfy all taxes upon said property and costs of sale, for a period of thirty days. The advertisement shall be by posting a notice at the main entrance of the municipal building and in a public and conspicuous place in the barrio or locality in which the land is situated, and by publication once a week for three weeks in a newspaper of general circulation in the district, published in the province, if any there be. The advertisement shall contain a statement of the amount of the taxes and the penalties so due and the time and place of sale, the name of the taxpayer against whom the taxes are levied, and a description of the land to be sold. At any time before the day fixed for the sale the taxpayer may discontinue all proceedings by paying the taxes, penalties and interest to the treasurer or his deputy. If he does not do so the sale shall proceed and shall be held either at the main entrance of the municipal building, or on the premises to be sold, as may have been determined by the treasurer or his deputy in the notice of sale. Within fifteen days after the sale the treasurer of the district or his deputy shall make return of the proceedings and spread it on his records. The purchaser at the sale shall receive a certificate from the treasurer of the district or his

deputy, showing the proceedings of the sale, describing the property sold, stating the name of the purchaser and setting out the exact amount of all taxes, penalties and interest, to satisfy which the sale was made.

SEC. 33. Within one year from the date of sale, the delinquent taxpayer, or anyone for him, shall have the right of paying to the treasurer of the district, or any authorized deputy, the amount of the taxes, penalties and interest thereon from the date of delinquency to the date of sale, together with interest on said purchase price at the rate of fifteen per centum per annum from the date of purchase to the date of redemption; and such payment shall entitle the person paying to the delivery of the certificate issued to the purchaser and a certificate from the treasurer of the district that he has thus redeemed the land, and the treasurer of the district shall forthwith pay over to the purchaser the amount by which such land has been redeemed, and the land thereafter shall be free from the lien of such taxes and penalties.

SEC. 34. In case the taxpayer shall not redeem the land sold as above provided within one year from the date of sale, the treasurer of the district, or his deputy in the name of such treasurer, shall, as grantor, execute a deed in form and effect sufficient in law to convey to the purchaser so much of the land against which the taxes have been assessed as has been sold, free from all liens of any kind whatsoever, and the deeds shall succinctly recite all the proceedings upon which the validity of the sale depends.

SEC. 35. In case there is no bidder at the public sale of such land who offers a sum sufficient to pay the taxes, penalties and costs, the treasurer of the district or his deputy shall declare the land forfeited to the Moro Province, and shall make, within fifteen days thereafter, a return of his proceedings and the forfeiture which shall be spread upon the records of his office.

SEC. 36. Within one year from the date of such forfeiture thus declared, the taxpayer, or anyone for him, may redeem said land, as above provided in cases where the land is sold. But, if the land is not thus redeemed within the year, the forfeiture shall become absolute and the treasurer of the district, or his deputy in his name, shall execute a deed, similar in form and having the same effect as the deed required to be made by him in case of a sale, conveying the land to the Moro Province. The deed shall be recorded as required by law for other land titles and shall be filed in the office of the district treasurer.

SEC. 37. The Treasurer of the Moro Province shall prepare such rules and regulations, to be followed by boards of assessors, boards of revision and collecting officers in carrying out the provisions of this act, as he may deem necessary. Whenever through lack of transportation, press of business or other unusual conditions it shall become impossible for collecting officers or the members of any board to perform the duties enjoined upon them by this act within the time provided therefor, the Treasurer of the Moro Province is authorized, in his discretion, to extend the time within which such duties may be performed as far as he may deem just and necessary. He may, with the consent of the Legislative Council, extend the time within which the land tax may be paid without becoming delinquent throughout the province, or in any district, municipality or locality thereof, when the prevalence of unusual or unforseen conditions render such action just and necessary.

SEC. 38. Every record or list required to be prepared and filed in the office of the treasurer of a district or secretary of a municipality by this act shall be a public record, open to the inspection of any person.

SEC. 39. The assessment of the land tax shall constitute a lawful indebtedness from the taxpayer to the Moro Province which may be enforced by the district treasurer by a civil action in any court of competent jurisdiction, and this remedy shall be in addition to all other remedies provided by this act.

SEC. 40. No court shall entertain any suit assailing the validity of a tax assessed under this act until the taxpayer shall have paid, under protest, the taxes assessed against him, nor shall any court declare any tax invalid by reason of irregularities or informalities in the proceedings of the officers charged with the assessment or collection of the taxes, or of a failure to perform their duties within the times herein specified for their performance, unless such irregularities, informalities or failures shall have impaired the substantial rights of the taxpayer, nor shall any court declare any tax assessed under the provisions of this act invalid except upon condition that the taxpayer shall pay the just amount of his tax, as determined by the court in the pending proceeding.

SEC. 41. No court shall entertain any suit assailing the validity of a tax sale of land under this act until the taxpayer shall have paid into court the amount

for which the land was sold, together with interest at the rate of fifteen per centum per annum upon that sum from the date of sale to the time of instituting suit, the money so paid into court shall belong to the purchaser at the tax sale if the deed is declared invalid, and shall be returned to the depositor should he fail in his action.

SEC. 42. No court shall declare any such sale invalid by reason of any irregularities or informalities in the proceedings of the officer charged with the duty of making the sale or by reason of failure by him to perform his duties within the time herein specified for their performance, unless such irregularities, informalities or failures shall have impaired the substantial rights of the taxpayer.

SEC. 43. Any person who shall wilfully and knowingly swear or testify falsely to any material matter before a municipal board of assessors or a district board of revision, while under oath, and any person who shall wilfully and knowingly submit or cause to be submitted the statement under oath required by section 6 of this act, knowing such sworn statement to contain any false assertion as to any material matter, shall be guilty of a misdemeanor and punishable by a fine not exceeding one thousand pesos or imprisonment not exceeding two years, or both, in the discretion of the court. Whenever it shall be proved that the true market value of the defendant's property at the time of submitting the statement under oath, required by section 6 of this act was three or more times the value declared by him in such sworn statement, such fact shall justify conviction unless the defendant shall explain the same to the satisfaction of the court.

SEC. 44. Any person charged with the duty of assessing real property, who shall wilfully omit from the tax lists real property which he knows to be lawfully taxable, shall be guilty of a misdemeanor and subject to the penalties provided in section 43.

SEC. 45. Any officer charged with any duty in connection with the assessment or collection of the land tax, who shall accept a bribe to influence his official action therein, shall be guilty of a misdemeanor and subject to the penalties provided in section 43.

SEC. 46. Any person offering a bribe to any officer charged with any duty in connection with the assessing or collecting of the land tax, for the purpose of influencing his official action, shall be guilty of a misdemeanor and subject to the penalties provided in section 43.

SEC. 47. The gross proceeds resulting from the collection of the land tax shall be covered into the Treasury of the Moro Province and shall constitute a part of the general funds of the province to be expended for provincial, district or municipal purposes.

SEC. 48. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, February 29, 1904.

Approved by the Philippine Commission April 4, 1904.

[ACT NO. 43.]—AN ACT To provide in part for the protection of pearl fisheries within the jurisdiction of the Moro Province.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. It shall be unlawful for any person to take from any waters within the jurisdiction of the Moro Province, or to have in his possession within the Moro province for the purpose of storage, transfer, sale, or for any other purpose whatsoever, any pearl shell or any bivalvular or lateral plate of any pearl shell of less than four and one-half inches in diameter, measured with a flat, rigid measuring rod along the line of the ligament which joins one bivalvular or lateral plate to the other at the hinge.

Any person violating the provisions of this act shall, upon conviction, be punished by a fine not exceeding five hundred dollars, or by imprisonment not exceeding one year, or both.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, February 29, 1904.

Approved by the Philippine Commission May 4, 1904.

[ACT No. 44.]—AN ACT To provide for the employment of one clerk, class H, in addition to the employees provided for in Act Numbered Twenty-three, in the office of the governor of the district of Cottabato, and fixing the salary thereof.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Subject to the provisions of Act No. 5 of the Philippine Commission, and its subsequent amendments, there shall be employed in the office of the Governor of the District of Cottabato, in addition to the employees provided for in Act No. 23 of the Legislative Council of the Moro Province, one clerk, class H.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, April 16, 1904.

Approved by the Philippine Commission May 24, 1904.

[ACT No. 45.]—AN ACT Appropriating the sum of sixty-five thousand six hundred and ninety-seven pesos and ninety-five centavos in Philippines currency, or so much thereof as may be necessary, in part compensation for the fiscal year nineteen hundred and four, and for other purposes.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums in Philippines currency, or so much thereof as may be respectively necessary, are hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated, in part compensation for the service of the Moro Province for the fourth quarter of the fiscal year nineteen hundred and four, unless otherwise stated.

GOVERNMENT OF THE MORO PROVINCE.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: Provincial Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one stenographer, class 7; one clerk, class H: one thousand seven hundred and eighty-five pesos.

Secretary's Office: Provincial Secretary, twenty per centum of his current proper yearly pay as an officer of the United States Army; one chief clerk, class 7; two stenographers, class 8; one clerk, class 10; one clerk, class H; one messenger, at two hundred and forty pesos per annum: three thousand two hundred and two pesos.

Attorney's Office: Provincial Attorney, at eight thousand pesos; Assistant Attorney, at three thousand two hundred pesos; one clerk, class D; one clerk, class K: three thousand two hundred and twenty pesos.

Treasurer's Office: Provincial Treasurer, at eight thousand pesos; one examiner, class 8; one clerk, class K: two thousand eight hundred and seventy pesos.

Engineer's Office: Provincial Engineer, twenty per centum of his current proper yearly pay as an officer of the United States Army; one chief clerk, class 8; one clerk, class 9; two clerks, class J: one thousand eight hundred and seventy-two pesos.

Office Superintendent of Schools: Superintendent of Schools, at eight thousand pesos; one clerk, class 8; one clerk, class 9; two translators, class A; one messenger, at one hundred and eighty pesos per annum: four thousand two hundred and forty-five pesos.

In all, for salaries, wages and allowances, Government of the Moro Province, seventeen thousand one hundred and ninety-four pesos.

CONTINGENT EXPENSES.

For the purchase of office furniture, fixtures and supplies, two thousand pesos; for rents for provincial offices and jail houses, nine hundred pesos; for miscellaneous expenses, including cablegrams, postage, doctor' fees; carrying out sanitary regulations, public surveys, advertising and other incidental e :penses, two hundred pesos: three thousand one hundred pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of provincial officers and employees, four hundred pesos; for transportation of freight, purchase of horses, wagons and carabaos, five hundred pesos: nine hundred pesos.

SCHOOL DEPARTMENT.

Salaries: One teacher, class 8; fifteen teachers, class 9; seven teachers, class 10; two teachers, at one thousand eight hundred pesos per annum; one teacher, at one thousand two hundred pesos per annum; two teachers, at eight hundred and forty pesos per annum; six teachers, at six hundred pesos per annum; fifteen teachers, at four hundred and eighty pesos per annum; thirty teachers, at three hundred and sixty pesos per annum; twelve teachers, at three hundred pesos per annum; six employees, at one hundred and twenty pesos per annum: eighteen thousand four hundred and nineteen pesos and eighty-five centavos.

Contingent Expenses: For rents of school buildings, three hundred pesos.

Transportation: For the actual and necessary traveling expenses of teachers, two hundred pesos; for the transportation of freight, two hundred pesos: four hundred pesos.

Salary and Expense fund: For the payment of teachers engaged in teaching night schools under the provisions of act numbered seventeen, two hundred and fifty pesos.

In all, for the school department, nineteen thousand three hundred and sixty-nine pesos and eighty-five centavos.

In all, for the Government of the Moro Province, forty thousand five hundred and sixty-three pesos and eighty-five centavos.

DISTRICT OF ZAMBOANGA.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one interpreter, class C; one interpreter, class D; one messenger, at two hundred and forty pesos per annum: one thousand and twenty pesos.

Secretary's Office: District Secretary, twenty per centum of his current proper yearly pay as an officer of the United States Army; one chief clerk, class 9; one typewriter, class C; one interpreter, class D; one clerk, class K: one thousand six hundred and thirty pesos.

Treasurer's Office: Treasurer of the District, class 6; one deputy, class H; one deputy, class K; one employee, at two hundred and forty pesos per annum: one thousand three hundred and ninety pesos.

In all, for salaries, wages and allowances District of Zamboanga, four thousand and forty pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, one hundred pesos; for the hire of the crew of the boat "Governor Finley" and other expenses incidental thereto, four hundred pesos: five hundred pesos.

CONTINGENT EXPENSES.

For expenses incidental to the administration of justice, six hundred pesos.

In all, for the District of Zamboanga, five thousand one hundred and forty pesos.

DISTRICT OF SULU.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one stenographer, class 8; one interpreter, class A; one messenger, at two hundred and forty pesos per annum: one thousand six hundred and ninety-five pesos.

Secretary's Office: District Secretary, twenty per centum of his current proper yearly pay as an officer of the United States Army; one clerk, class 10; one employee, at one hundred and ninety-two pesos per annum: eight hundred and eighty pesos.

Treasurer's Office: Treasurer of the District, class 7; one deputy, class J; one employee, at two hundred pesos per annum: nine hundred pesos.

In all, for salaries, wages and allowances, District of Sulu, three thousand four hundred and seventy-five pesos.

CONTINGENT EXPENSES.

For rent of district offices and court house, one hundred and twenty pesos; for expenses incidental to the administration of justice, four hundred pesos; for the repair of public buildings, two hundred pesos: seven hundred and twenty pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of District officers and employees, three hundred pesos.

In all, for the District of Sulu, four thousand four hundred and ninety-five pesos.

DISTRICT OF COTTABATO.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one interpreter, class H; one interpreter, class J; one clerk, class H; one messenger, at two hundred and forty pesos per annum: nine hundred pesos.

Secretary's Office: District Secretary, at three thousand pesos per annum, seven hundred and fifty pesos.

Treasurer's Office: Treasurer of the District, class 6; one deputy, class J; one employee, at two hundred pesos per annum: nine hundred and seventy pesos.

In all, for salaries, wages and allowances for the District of Cottabato, two thousand six hundred and twenty pesos.

CONTINGENT EXPENSES.

For rents of district offices and court house, three hundred pesos; for expenses incidental to the administration of justice, four hundred pesos: seven hundred pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, one hundred and fifty pesos.

In all, for the District of Cottabato, three thousand two hundred and ninety pesos.

DISTRICT OF DAVAO.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one clerk, class A: six hundred and seventy-five pesos.

Secretary's Office: District Secretary, at two thousand four hundred pesos per annum: six hundred pesos.

Treasurer's Office: Treasurer of the District, class 7; one deputy, class J; one employee, at an annual salary of two hundred pesos: nine hundred and seventy pesos.

In all, for salaries, wages and allowances, District of Davao, two thousand two hundred and forty-five pesos.

CONTINGENT EXPENSES.

For expenses incidental to the administration of justice, three hundred pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, four hundred pesos.

In all, for the District of Davao, two thousand nine hundred and forty-five pesos.

DISTRICT OF LANAO.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one clerk, class A; one interpreter, class B; one messenger, at an annual salary of two hundred and forty pesos: one thousand and forty pesos.

Secretary's Office: District Secretary, at three thousand pesos per annum; seven hundred and fifty pesos.

Treasurer's Office: District Treasurer, class 8; one deputy, class J; one employee, at an annual salary of two hundred pesos: eight hundred and seventy pesos.

In all, for salaries, wages and allowances, District of Lanao, two thousand six hundred and sixty pesos.

CONTINGENT EXPENSES.

For rent of district offices, court house and jail, one hundred and twenty pesos; for expenses incidental to the administration of justice, two hundred pesos: three hundred and twenty pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, three hundred pesos.

In all, for the District of Lanao, three thousand two hundred and eighty pesos.

MISCELLANEOUS.

Provincial Salary and Expense Fund: For the payment of the Civil Service employees engaged in translating public documents under the provisions of act No. 41 of the Legislative Council, at not to exceed seventy-five cents, currency of the United States, per hour, five hundred pesos; for the payment of Datto Sakilan for services rendered as Moro Interpreter to the Commanding Officer at Bongao, District of Sulu, in civil affairs, in full for the period from the fifteenth day of July, nineteen hundred and three, to the first day of April, nineteen hundred and four, the date on which he ceased to render such services, one hundred and fifty pesos: six hundred and fifty pesos.

Repair of Public Building at Davao: For the repair of the public building at Davao, used for district offices, one thousand five hundred pesos, to be expended under the direction of the Provincial Engineer with the approval of the Legislative Council, and to remain available until expended.

Municipality of Siassi: To defray the current expenses of the municipality of Siassi for the months of April, May and June, nineteen hundred and four, five hundred pesos. The said sum may be expended for any purpose for which municipal funds may be expended, upon authorization by the Municipal Council. The municipal president shall issue warrants on the Treasurer of the District of Sulu, who shall make all disbursements and shall render accounts therefor as for provincial funds disbursed by him for district purposes.

Total appropriation for all purposes, sixty-five thousand six hundred and ninety-seven pesos and ninety-five centavos, in Philippines currency, or so much thereof as may be necessary.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, April 16, 1904.

Approved by the Philippine Commission, (with the exception of the third paragraph under the head of "Miscellaneous," which was declared null and void) May 24, 1904.

[ACT No. 46.]—AN ACT Appropriating the sum of five thousand pesos, Philippines currency, for the repair and reconstruction of the government wharf at Zamboanga.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. There is hereby appropriated, out of any funds in the treasury of the Moro Province not otherwise appropriated, the sum of five thousand pesos, Philippines currency, for the purpose of repairing and reconstructing the Government wharf at Zamboanga, District of Zamboanga, to remain available until expended. Said sum shall be expended under the direction of the Provincial Engineer, *in accordance with the provisions of section twenty-three of act numbered seven hundred and eighty-seven of the Philippine Commission.*[a]

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, May 4, 1904.

Approved by the Philippine Commission as amended May 27, 1904.

[ACT No. 47.]—AN ACT Subjecting the use, licensing and registration of boats of Moro or pagan construction to the provisions of the general customs administrative law.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The use, registration and licensing of boats of Moro or pagan construction of less than ten tons burden shall be governed by the provisions of the general customs administrative law of the Philippine Islands and the regulations of the Insular Collector of Customs. *Provided*, that collectors of customs may, in their discretion, when they shall have reason to believe that any Moro or other non-Christian making unauthorized use of such boats has acted in good faith and through excusable ignorance of the law, remit the penalty imposed for the first offense.

SEC. 2. The governors of districts, the headmen of tribal wards, and any person who shall be authorized in writing by the Governor of the Moro Province, are authorized to seize boats of Moro or pagan construction of less than ten tons burden found engaged in the coasting trade in violation of law, without warrant, and to deliver the same immediately to the collector of customs at the nearest open port. The headman of each tribal ward shall receive for each boat belonging to a resident of his tribal ward which shall be voluntarily presented for admeasurement and licensing during the year nineteen hundred and four, the sum of fifty centavos, Philippines currency, to be paid by appropriation from provincial funds, under such regulations as the Treasurer of the Moro Province shall prescribe.

SEC. 3. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, May 4, 1904.

Approved by the Philippine Commission May 27, 1904.

[ACT No. 48.]—AN ACT To amend Act Numbered Thirty-five of the Legislative Council, entitled "The Municipal Code of the Moro Province."

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Act No. 35 of the Legislative Council, entitled "The Municipal Code of the Moro Province," is hereby amended by striking out of the first paragraph of subsection (*i*) of section 45 the last sentence, as follows: "One-half of the proceeds of such tax shall be paid into the municipal treasury and one-half shall be paid into the Provincial treasury."

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, May 31, 1904.

Approved by the Philippine Commission July 11, 1904.

[a] The words in italics were added by resolution of the Philippine Commission of May 27, 1904.

[ACT No. 49.]—AN ACT Appropriating the sum of one thousand nine hundred and ninety-eight pesos and ninety-three centavos, Philippines currency, or so much thereof as may be necessary, for sundry expenses of the government of the Moro Province for the third and fourth quarters of the fiscal year nineteen hundred and four.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums, in Philippines currency, or so much thereof as may be respectively necessary, are hereby appropriated out of any funds in the treasury of the Moro Province not otherwise appropriated, in part compensation for the service of the Moro Province for the third and fourth quarters of the fiscal year nineteen hundred and four:

For repair of public buildings, District of Cottabato, fifty-one pesos and sixty centavos.

For the municipality of Jolo, District of Sulu, in reimbursement of municipal funds expended during the period from February first to April thirtieth, nineteen hundred and four, for repair of public road "Astorias", Island of Sulu, damaged by flood, seven hundred and seventy-one pesos and thirty-three centavos; for clearing the jungle and making a trail from Patical to Tandah, Island of Sulu, one hundred and seventy-six pesos: nine hundred and forty-seven pesos and thirty-three centavos, which sum shall be disbursed by the Treasurer of the District of Sulu upon the presentation of proper vouchers approved by the Governor of the District of Sulu and the president of the municipality of Jolo. The action of the municipality of Jolo in making the disbursements herein referred to is hereby approved.

For the payment of a commission of five per centum of amounts collected to municipal treasurers and Moro headmen while acting as deputies of the district treasurers in the collection of the cedula tax, one thousand pesos, to be transferred by the Treasurer of the Moro Province to the district treasurers for disbursement in such amounts as he shall, in his discretion, deem necessary.

Total appropriation, for all purposes, one thousand nine hundred and ninety-eight pesos and ninety-three centavos, in Philippines currency, or so much thereof as may be necessary.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, May 31, 1904.

Approved by the Philippine Commission July 11, 1904.

[ACT No. 50.]—AN ACT Creating district boards.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. There shall be in each district of the Moro Province a district board, to be composed of the district governor, who shall be the presiding officer thereof, the district secretary, who shall be the secretary of the board and keep its minutes, and the district treasurer. In the absence of the district governor the district secretary shall also act as the presiding officer of the board. The district board shall hold weekly meetings upon a day to be fixed by the board, and special meetings upon the call of the presiding officer; and shall perform such duties and exercise such powers as are or hereafter shall be provided by law.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, May 31, 1904.

Approved by the Philippine Commission July 11, 1904.

[ACT No. 51.]—AN ACT Regulating the fishing for shells of marine mollusca, and amending Act Numbered Forty-three of the legislative council.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Except as provided by this act, it shall be unlawful for any person to take any shell of the pearl oyster or of other marine mollusca from the sea within a radius of three marine leagues from any land within the territorial limits of the Moro Province.

SEC. 2. No license to engage in the fishing for or the gathering of shells of marine mollusca within the waters described in section 1 of this act shall be issued to any vessel (*a*) not built in the Philippine Islands or in the United States, and (*b*) not wholly owned by citizens of the United States, honorably discharged soldiers or sailors of the Army or Navy of the United States, natives of the Philippines Islands, or persons who have, under and by virtue of the Treaty of Paris, acquired the political rights of natives of the Philippine Islands. *Provided*, that any vessel built in a foreign country, owned wholly by persons mentioned in subsection (*b*) of this section, and actually engaged in fishing for shells of marine mollusca in the waters described in section 1 of this act at any time during a period of one year prior to the passage of this act, may, if application for a license therefor be made within sixty days from the passage of this act, continue in such industry for a period of five years, unless sooner excluded by act of Congress or of the Philippine Commission.

SEC. 3. No license to engage in the fishing for or the gathering of shells of marine mollusca within the waters described in section 1 of this act shall be issued to any vessel (*a*) when two convictions of the same or different persons shall have been had for two distinct violations of any law of the Philippine Commission or of the Legislative Council governing such industry committed by such person or persons while engaged on or about the vessel, or (*b*) which is owned or operated in whole or in part by, or upon which there is employed, any person who has twice been convicted of such violations.

SEC. 4. Licenses shall be issued by the Treasurer of the district in the waters of which the vessel carries on the major part of its operations; but such licenses shall entitle the vessel to operate in any of the waters described in section 1 of this act. Licenses shall remain in force for a period of one year from the date on which they are issued, unless sooner revoked by the treasurer who issued the same, for any of the causes mentioned in subsections (*a*) and (*b*) of the preceding section. When a license is revoked no part of the sum paid therefor shall be refunded. *Provided*, that first class licenses may be issued for a period of six months upon the payment of one-half of the sum mentioned in section 6 if this act.

SEC. 5. The Treasurer of the Moro Province shall cause the proper forms for licenses to be prepared, and shall issue such instructions to the district treasurers as may be necessary to carry out the provisions of this act relating to the issuance of licenses.

SEC. 6. A license to engage in the fishing for or the gathering of shells of marine mollusca of all species, with the aid of submarine armor, may be issued to a vessel upon the payment of the sum of five hundred pesos, Philippine currency, for each of the greatest number of divers clad in such armor to be employed by the vessel beneath the surface of the water at any one time. It shall be unlawful to employ at any one time beneath the surface of the water a greater number of such divers than is authorized by the license. A license of this class shall be known as a "first class shell license."

SEC. 7. A license to engage in the fishing for or the gathering of shells of marine mollusca of all species, without the aid of submarine armor, may be issued to a vessel upon the payment of the sum of five pesos, Philippine currency, for each of the greatest number of unarmored divers to be employed by the vessel during any voyage, and the same sum for each of the greatest number of submarine dredges or rakes to be employed by the vessel beneath the surface of the water at any one time. It shall be unlawful to employ during a voyage a greater number of divers or to employ beneath the surface of the water at any one time a greater number of submarine dredges or rakes than is authorized by the license. A license of this class shall be known as a "second class shell license."

SEC. 8. The fishing for or the gathering of shells of marine mollusca of all species without the aid of boats, vessels, submarine dredges or rakes, or submarine armor, and the fishing for or the gathering of marine mollusca whose shells have a market value of less than twenty-five pesos, Philippine currency, per ton, shall be unrestricted.

SEC. 9. It shall be the duty of district treasurers upon issuing any license under this act to deliver to the person receiving the same a copy of act No. 43 of the Legislative Council, a copy of this act, and a copy of all other acts governing the fishing for or the gathering of shells of marine mollusca which may hereafter be enacted. The master of the licensed vessel shall preserve the same in a conspicuous place on the vessel open to the inspection of all persons. Every master of a vessel licensed under this act who fails to comply with the provi-

sions of this section shall be punished by a fine of not exceeding one hundred pesos, Philippine currency, for each offense.

SEC. 10. The provisions of this act shall not apply to vessels of less than fifteen tons burden owned, manned and operated wholly by Moros or other non-Christians, not transported by or used in connection with other vessels, and not employing submarine armor, until the first day of January nineteen hundred and six. *Provided*, that the provisions of act No. 43 of the Legislative Council and such provisions of this act as relate to the prosecution of violations of said act No. 43 shall apply and be enforced without distinction of persons.

SEC. 11. The Governor of the District of Sulu shall immediately investigate the alleged claims of certain Moros residing within his district to property rights in the shells of marine mollusca in the seas adjacent to their places of residence, and shall report to the Governor of the Moro Province the extent and comparative richness, so far as known, of the deposits of shells which are recognized by tribal custom as belonging to each of such Moros. A sum equal to one-half of the gross proceeds resulting from the issuance of licenses under this act by the Treasurer of the District of Sulu during the years nineteen hundred and four and nineteen hundred and five shall be set aside by appropriation and disbursed among such Moros in a proportion to be determined by the Governor of the Moro Province, based upon the relative importance of the claims of each so recognized by tribal custom; and such payment shall be understood to be in full and final settlement of the supposed property rights of the Moros of the District of Sulu in such shells of marine mollusca.

SEC. 12. It shall be unlawful for any Moro or any other person to intermeddle with or exact or attempt to exact any payment or tribute from any person engaged in the fishing for or the gathering of shells of marine mollusca, by virtue of this act, or to prevent or attempt to prevent any person or vessel from lawfully engaging in such industry.

SEC. 13. It shall be unlawful for any vessel engaged in the fishing for or the gathering of shells of marine mollusca under a first class shell license to discharge any portion of the shells, taken, or to leave the waters described in section 1 of this act, except by reasons of stress of weather or other necessity, without first proceeding to the port of Jolo or Zamboanga and making the statement required by the following section.

SEC. 14. Every master of a vessel operating under a first class shell license shall accurately enter in a log or record book the date of every operation and the number and weight of the shells of the pearl oyster taken each day. Upon entering the port of Jolo or Zamboanga, and before landing any of the cargo, the master shall verify, on oath, before the collector of customs such log or record book as containing a true statement of the operations of the vessel in gathering or fishing for the shells of the pearl oyster; and for any false statement so made he shall be liable to the penalties provided by section 17, of this act.

SEC. 15. Every master of a vessel licensed under this act, and every person on board such vessel in charge of the fishing for or the gathering of shells of marine mollusca, shall be criminally liable for all violations of the law governing such industry, to the same extent as the persons actually guilty thereof, when such violations are committed by members of the crew or persons employed on or about the vessel in his presence or with his knowledge and consent.

SEC. 16. If any unlicensed vessel shall be found within the waters to which this act applies, having on board shells mentioned in this act, or submarine armor suitable for taking shells, or if any vessel operating under a second class shell license shall be found in such waters having on board submarine armor suitable for taking shells, it shall be presumed that the master of the vessel and the owner of the submarine armor, if on board, were engaged in gathering or fishing for shells in violation of this act until it is otherwise sufficiently proved.

SEC. 17. Every person guilty of the commission of an act declared to be unlawful by this act shall, upon conviction, be punished by imprisonment not exceeding six months or by a fine of not less than fifty and not more than one thousand pesos, Philippine currency, or by both such fine and imprisonment, for each offense.

SEC. 18. Violations of act No. 43 of the Legislative Council and of this act may be prosecuted in any court of first instance of the Moro Province; but the court first lawfully taking cognizance thereof shall have jurisdiction of the same to the exclusion of all other courts.

SEC. 19. In prosecutions for violations of act No. 43 of the Legislative Council and of this act the court may, in its discretion, when it shall have reason to believe that any person guilty of such violation has acted through excusable ignorance of the law, remit the penalties imposed by law therefor.

SEC. 20. For the purpose of enforcing this act and act No. 43 of the Legislative Council the governors of the districts, collectors of customs and masters of vessels of the Insular Government when authorized thereto by the heads of their respective bureaus, and any person authorized in writing by the Governor of the Moro Province, are hereby made peace officers. It shall be their duty to seize and arrest all vessels found engaged, used or employed in the waters described in section 1 of this act in violation of the law governing the fishing for or gathering of shells of marine mollusca, without warrant, and to take the same with all persons on board thereof to the most convenient open port, there to be dealt with according to law.

SEC. 21. A reward of five hundred pesos, Philippine currency, to be claimed, determined and paid in accordance with the provisions of sections 2 and 3 of act No. 40, of the Legislative Council, shall be paid for information leading to the arrest and conviction of persons guilty of violations of this act or of act No. 43 of the Legislative Council.

SEC. 22. Act No. 43 of the Legislative Council is hereby amended by inserting after the word "hinge" in the first section thereof the following: "unless the lateral plate of such shell shall be more than seven inches in diameter, measured with a flat, rigid measuring rod from the outer edge of the horny lip to the center of the hinge, the rod being so placed as to form a right angle with the line of the hinge. *Provided*, that, should such shell be removed from the water through accident or excusable negligence, no penalty shall be incurred if the shell be returned to the water immediately, without opening or attempting to open the same. It shall also be unlawful to open or attempt to open in the water any shell of the pearl oyster which it is unlawful to take from the water." The words "waters within the jurisdiction of the Moro Province" as used in said section shall be construed to mean the waters described in section 1 of this act.

SEC. 23. The words "pearl shell" and "shell of the pearl oyster", as used in act No. 43 of the Legislative Council and in this act, shall be construed to mean the shell of the oyster of the species of marine bivalve mollusca of the genus *Meleagrina margaritifera*, commonly known as the pearl oyster.

SEC. 24. All laws or parts of laws relating to the gathering of or the fishing for shells of marine mollusca are hereby repealed in their application to the waters described in section 1 of this act.

SEC. 25. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage; but no penalty shall be imposed for the commission, prior to the first day of August, nineteen hundred and four, of any act herein declared to be unlawful, unless the prosecution shall affirmatively prove knowledge on the part of the accused of the unlawful nature of such act.

Enacted, June 7, 1904.

Approved by the Philippine Commission July 19, 1904.

[ACT No. 52.]—AN ACT To provide for the payment of the costs of criminal prosecutions and preliminary investigations before justices of the peace appointed in accordance with the provisions of section twenty-seven of act numbered seven hundred and eighty-seven of the Philippine Commission, as amended by act numbered eleven hundred and sixty-four of the Philippine Commission.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. In criminal prosecutions and preliminary investigations before justices of the peace appointed in accordance with the provisions of section 27 of act No. 787 of the Philippine Commission, as amended by act No. 1164 of the Philippine Commission, the costs of the proceeding, including the fees of the justice, shall be paid from the treasury of the municipality in which the action arises in accordance with the provisions of law governing the subject in other provinces.

SEC. 2. In addition to the detailed statements required by section 71 of act No. 136 of the Philippine Commission and section 1 of act No. 302 of the Philippine Commission, the justice of the peace shall, on the first day of each month,

present to the treasurer of the municipality in which his court is situated, or if situated without the limits of an organized municipality, to the treasurer of the municipality within the district most convenient of access, a separate detailed statement of the fines and costs collected by him and of the fees accruing to him and to officers of courts by reason of criminal prosecutions and preliminary investigations arising without the limits of the municipality during the preceding month. He shall at the same time pay into the municipal treasury the fines and costs collected by him in such criminal prosecutions during the same period. The accounts thus rendered shall be audited and payment made from the municipality as in the case of actions arising within the municipality. On the first day of each quarter of the fiscal year the municipal treasurer shall render to the Treasurer of the Moro Province an account with proper vouchers of the accounts collected and paid out by reason of criminal prosecutions and preliminary investigations arising without the limits of the municipality during the preceding quarter. Should such account, as audited and approved by the Treasurer of the Moro Province, show an excess of disbursements over collections, the municipality shall be reimbursed the amount of the excess from the regular appropriation for the district for "expenses incidental to the administration of justice"; but should the account show an excess of collections over disbursements, then the municipality shall pay into the provincial treasury, a sum equivalent to such excess.

SEC. 3. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, June 7, 1904.

Approved by the Philippine Commission July 19, 1904.

[ACT No. 53.]—AN ACT Amending section one of Act Numbered Twelve of the Legislative Council, entitled "An act to provide for the employment of certain subordinate employees in the office of the Engineer of the Moro Province and fixing the salaries thereof."

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Sub-section (*b*) of section 1 of act No. 12 of the Legislative Council, entitled "An act to provide for the employment of certain subordinate employees in the office of the Engineer of the Moro Province and fixing the salaries thereof", is hereby amended to read as follows:

(*b*) One clerk, Class H.
One clerk, Class K.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, June 7, 1904.

Approved by the Philippine Commission July 26, 1904.

[ACT No. 54.]—AN ACT Appropriating the sum of three thousand one hundred and fifty-four pesos and ten centavos, Philippines currency, or so much thereof as may be necessary, for the construction of bridges at Jolo.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

The Philippine Commission having, by resolution adopted on the twenty-fourth day of May, nineteen hundred and four, annulled the paragraph entitled, "Construction of bridges at Jolo," under the head of miscellaneous appropriations in section 1 of act No. 45 of the Legislative Council, the following is enacted in lieu thereof:

SECTION 1. There is hereby appropriated out of the proceeds derived from the sale of congressional relief fund rice deposited in the provincial treasury in accordance with the provisions of section 3 of act No. 786 of the Philippine Commission, as amended by act No. 814 of the Philippine Commission, the sum of three thousand one hundred and fifty-four pesos and ten centavos, Philippines currency, or so much thereof as may be necessary, for the construction of three wagon bridges within the municipal limits of the municipality of Jolo, known

as the "Tulai", "Astorias" and "La Reina" Bridges, recently destroyed by flood. Said sum shall remain available until expended.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, June 8, 1904.

Approved by the Philippine Commission as amended July 26, 1904.

[ACT No. 55.]—AN ACT Appropriating the sum of one thousand eight hundred and fifty pesos, Philippine currency, or so much thereof as may be necessary, for the construction in the municipality of Zamboanga of a public market for the especial use of the Moro and other non-Christian inhabitants of the district of Zamboanga, and providing for the administration thereof.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. There is hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated the sum of one thousand eight hundred and fifty pesos, in Philippine currency, or so much thereof as may be necessary, for the construction, in the barrio of Magay, municipality of Zamboanga, of a public market.

SEC 2. The market referred to in the preceding section, when completed, shall be placed under the control of the Governor of the District of Zamboanga, to be administered for the especial use and benefit of the Moro and other non-Christian inhabitants of said district, and shall be exempt from taxation by the municipality. The Governor of the District of Zamboanga may, in his discretion, establish rules and regulations governing the use and sanitation of said market, and may, with the approval of the Treasurer of the Moro Province, fix licenses for the use of the same. Licenses shall be collected and accounted for under such rules and regulations as shall be prescribed by the Treasurer of the Moro Province, and shall accrue to a special fund to be expended solely for the maintenance, improvement and repair of said market.

SEC. 3. The district Governor may also, with the approval of the Legislative Council, lease gratuitously or for a valuable consideration the use of such market to an association or corporation to be composed of Moros and other non-Christian inhabitants of the district, and in such case the association or corporation shall be entitled to the profits accruing from the use of the same. *Provided*, that the articles of association or incorporation of such association or corporation shall provide for the general supervision and control of the affairs of the association or corporation by the Governor of the District of Zamboanga, and shall be submitted to the Legislative Council for approval, and it shall be a condition to the use of the market that the Legislative Council may at any time by resolution terminate the lease. The object of the District Governor in exercising supervision and control over the affairs of the association or corporation shall be to instruct the Moro and other non-Christian inhabitants of his district in modern and legitimate business methods to the end that they may secure a fair remuneration for the products of their labor, and such supervision and control shall be confined within the narrowest limits compatible with the object sought.

SEC. 4. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, June 14, 1904.

Approved by the Philippine Commission July 26, 1904.

[ACT No. 56.]—AN ACT To provide for the employment of temporary clerks to aid in the preparation of the tax list of the municipality of Zamboanga for the year nineteen hundred and four, and to authorize the payment of extra compensation to native teachers on vacation so employed.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The Governor of the Moro Province is hereby authorized to employ not to exceed ten temporary clerks at a salary of not to exceed one peso, Philippine currency, per day, to aid in the preparation of the tax list of

the municipality of Zamboanga for the year nineteen hundred and four. Native teachers on vacation may be employed under the provisions of this act and shall receive compensation for the services so rendered by them, anything in the provisions of act No. 148 of the Philippine Commission to the contrary notwithstanding. Such temporary clerks shall perform their services under the supervision of the Treasurer of the District of Zamboanga, and shall be paid by appropriation from provincial funds. *Provided*, that the period of employment shall in no case exceed thirty days.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, June 14, 1904.

Approved by the Philippine Commission July 26, 1904.

[ACT No. 57.]—AN ACT Authorizing the employment, under certain conditions, of enlisted men of the United States Army as skilled laborers on public works.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. When and for such periods only as it shall be impossible or impracticable otherwise to secure sufficient skilled labor on public works of the Moro Province, the Engineer of the Moro Province is authorized to employ, with the consent of the Department Commander first had, enlisted men of the United States Army as skilled laborers on such public works. Enlisted men so employed shall receive for their services from the appropriation for the public work on which they are employed, a daily or hourly wage to be fixed by the Engineer with the advice and consent of the Legislative Council, anything in act No. 148 of the Philippine Commission to the contrary notwithstanding. This act is made retroactive to authorize the payment of wages to enlisted men previously employed on public works of the Province.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, June 14, 1904.

Approved by the Philippine Commission July 26, 1904.

[ACT No. 58.]—AN ACT Appropriating the sum of one hundred and sixty-four pesos, Philippine currency, or so much thereof as may be necessary, for the payment of the salaries of the temporary clerks appointed under the provisions of Act Numbered Fifty-six of the Legislative Council.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The sum of one hundred and sixty-four pesos, Philippine currency, or so much thereof as may be necessary, is hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated, for the payment of the salaries of the temporary clerks appointed under the provisions of act No. 56 of the Legislative Council.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, June 29, 1904.

Approved by the Philippine Commission August 5, 1904.

[ACT No. 59.]—AN ACT Appropriating the sum of eleven thousand pesos, Philippine currency, from the three hundred thousand pesos of the Congressional relief fund allotted the Moro Province, for the emergency improvement of the Iligan-Lake Lanao road.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The sum of eleven thousand pesos, in Philippine currency, or so much thereof as may be necessary, is hereby appropriated, out of the sum of three hundred thousand pesos, Congressional Relief Fund, allotted the Moro

Province and not otherwise appropriated, for the continuance of the emergency improvement of the Iligan-Lake Lanao road, to remain available until expended.

SEC. 2. The amount herein appropriated shall be available for payment for work performed and material purchased subsequent to June 10, 1904, as well as for the payment for material and labor to be hereafter required.

SEC. 3. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, July 5, 1904.

Approved by the Philippine Commission August 5, 1904.

[ACT No. 60.]—AN ACT Appropriating the sum of one thousand five hundred pesos, Philippine currency, for the repair and reconstruction of the government wharf at Zamboanga.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. There is hereby appropriated, out of any funds in the treasury of the Moro Province not otherwise appropriated, the sum of one thousand five hundred pesos, Philippine currency, for the purpose of repairing and reconstructing the government wharf at Zamboanga, District of Zamboanga, to remain available until expended.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, July 12, 1904.

Approved by the Philippine Commission August 5, 1904.

[ACT No. 61.]—AN ACT Appropriating the sum of eighty-one thousand nine hundred and thirty-eight pesos and eighty-five centavos in Philippine currency, or so much thereof as may be necessary, in part compensation for the fiscal year nineteen hundred and five, and for other purposes.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums in Philippine currency, or so much thereof as may be respectively necessary, are hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated, in part compensation for the service of the Moro Province for the first quarter of the fiscal year nineteen hundred and five, unless otherwise stated.

GOVERNMENT OF THE MORO PROVINCE.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: Provincial Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one stenographer, class 7; one clerk, class H: one thousand eight hundred and eighty-five pesos.

Secretary's Office: Provincial Secretary, twenty per centum of his current proper yearly pay as an officer of the United States Army; one chief clerk, class 7; two stenographers, class 8; one clerk, class 10; one clerk, class H; one messenger, at two hundred and forty pesos per annum: three thousand two hundred and two pesos.

Attorney's Office: Provincial Attorney, at eight thousand pesos; Assistant Attorney, at three thousand two hundred pesos; one clerk, class D; one clerk, class K: three thousand three hundred and twenty pesos.

Treasurer's Office: Provincial Treasurer, at eight thousand pesos; one examiner, class 8; one clerk, class K: two thousand eight hundred and seventy pesos.

Engineer's Office: Provincial Engineer, twenty per centum of his current proper yearly pay as an officer of the United States Army; one chief clerk, class 8; one clerk, class 9; one clerk, class H; one clerk, class K: two thousand one hundred and seventy-two pesos.

Office Superintendent of Schools: Superintendent of Schools, at eight thousand pesos; one clerk, class 8; one clerk, class 9; two translators, class A; one messenger, at one hundred and eighty pesos per annum: four thousand two hundred and forty-five pesos.

In all, for salaries, wages and allowances, Government of the Moro Province, seventeen thousand six hundred and ninety-four pesos.

CONTINGENT EXPENSES.

For the purchase of supplies, three thousand pesos; for repairs to office furniture, three hundred pesos; for rents for provincial offices and jail houses, one thousand pesos; for expenses incidental to the administration of justice, one thousand pesos; for miscellaneous expenses, including cablegrams, postage, doctor fees, carrying out sanitary regulations, public surveys, advertising and other incidental expenses, two hundred pesos: five thousand five hundred pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of provincial officers and employees, seven hundred pesos; for transportation of freight, purchase of horses, wagons, and carabaos, three hundred pesos: one thousand pesos.

SALARY AND EXPENSE FUND.

For translating public laws, four hundred pesos; for premium on bonds of bonded employes, two thousand four hundred pesos: two thousand eight hundred pesos.

SCHOOL DEPARTMENT.

Salaries: One teacher, class 8; fifteen teachers, class 9; seven teachers, class 10; two teachers, at one thousand eight hundred pesos per annum; one teacher, at one thousand two hundred pesos per annum; two teachers, at eight hundred and forty pesos per annum; six teachers, at six hundred pesos per annum; fifteen teachers, at four hundred and eighty pesos per annum; thirty teachers, at three hundred and sixty pesos per annum; twelve teachers, at three hundred pesos per annum; six employes, at one hundred and twenty pesos per annum: eighteen thousand four hundred and nineteen pesos and eighty-five centavos.

Contingent Expenses: For supplies, eight thousand pesos; for rents of school building, one thousand pesos; for repair and construction of buildings, two thousand pesos: eleven thousand pesos.

Transportation: For the actual and necessary traveling expenses of teachers, four hundred pesos.

Salary and Expense Fund: For the payment of teachers engaged in teaching night schools under the provisions of act numbered seventeen, five hundred pesos.

In all, for the school department, thirty thousand three hundred and nineteen pesos and eighty-five centavos.

In all, for the Government of the Moro Province, fifty-seven thousand three hundred and thirteen pesos and eighty-five centavos.

DISTRICT OF ZAMBOANGA.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one interpreter, class C; one interpreter, class D; one messenger, at two hundred and forty pesos per annum: one thousand and twenty pesos.

Secretary's Office: District Secretary, twenty per centum of his current proper yearly pay as an officer of the United States Army; one chief clerk, class 9; one typewriter, class C; one interpreter, class D; one clerk, class K: one thousand six hundred and thirty pesos.

Treasurer's Office: Treasurer of the District, class 6; one deputy, class H; one employee, at two hundred and forty pesos per annum: one thousand three hundred and ninety pesos.

In all, for salaries, wages and allowances, District of Zamboanga, four thousand and forty pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employes, one hundred and fifty pesos; for the hire of the crew of the boat "Governor Finley" and other expenses incidental thereto, four hundred pesos: five hundred and fifty pesos.

CONTINGENT EXPENSES.

For expenses incidental to the administration of justice, six hundred pesos.

SALARY AND EXPENSE FUND.

For temporary employes assisting Registrar of Deeds, one hundred and fifty pesos; for payment of commission on the collection of cedulas, four hundred pesos; for board of assessors, four hundred pesos; information fund, two hundred pesos: one thousand one hundred and fifty pesos.

In all, for the District of Zamboanga, six thousand three hundred and forty pesos.

DISTRICT OF SULU.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one stenographer, class 8; one interpreter, class A; one messenger, at two hundred and forty pesos per annum: one thousand six hundred and ninety-five pesos.

Secretary's Office: District Secretary, twenty per centum of his current proper yearly pay as an officer of the United States Army; one clerk, class 10; one employee, at one hundred and ninety-two pesos per annum: eight hundred and eighty pesos.

Treasurer's Office: Treasurer of the District, class 7; one deputy, class J; one employee, at two hundred pesos per annum: nine hundred pesos.

In all, for salaries, wages and allowances, District of Sulu, three thousand four hundred and seventy-five pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, three hundred pesos; for the transportation of freight, one hundred and fifty pesos: four hundred and fifty pesos.

CONTINGENT EXPENSES.

For rent of district offices and court house, one hundred and ninety-five pesos; for expenses incidental to the administration of justice, four hundred pesos: five hundred and ninety-five pesos.

SALARY AND EXPENSE FUND.

For information fund, two hundred pesos; for board of assessors, one hundred pesos: three hundred pesos.

In all, for the District of Sulu, four thousand eight hundred and twenty pesos.

DISTRICT OF COTTABATO.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one interpreter, class II; one interpreter, class J; one clerk, class 8; one messenger, at two hundred and forty pesos per annum: nine hundred pesos.

Secretary's Office: District Secretary, at three thousand pesos per annum; seven hundred and fifty pesos.

Treasurer's Office: Treasurer of the District, class 6; one deputy, class J; one employee, at two hundred pesos per annum: one thousand and seventy pesos.

In all, for salaries, wages and allowances, District of Cottabato, two thousand seven hundred and twenty pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, two hundred and fifty pesos; for the transportation of freight, one hundred and fifty pesos: four hundred pesos.

CONTINGENT EXPENSES.

For rent of district offices and court house, one hundred and twenty pesos; for expenses incidental to the administration of justice, five hundred pesos: six hundred and twenty pesos.

SALARY AND EXPENSE FUND.

For commission on cedulas, six hundred pesos; for information fund, two hundred pesos; for board of assessors, two hundred pesos: one thousand pesos.

In all, for the District of Cottabato, four thousand seven hundred and forty pesos.

DISTRICT OF DAVAO.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one clerk, class A: six hundred and seventy-five pesos.

Secretary's Office: District Secretary, at two thousand four hundred pesos per annum: six hundred pesos.

Treasurer's Office: Treasurer of the District, class 7; one deputy, class J; one employee, at an annual salary of two hundred pesos: one thousand and seventy pesos.

In all, for salaries, wages and allowances, District of Davao, two thousand, three hundred and forty-five pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, four hundred pesos; for transportation of freight, one hundred and fifty pesos: five hundred and fifty pesos.

CONTINGENT EXPENSES.

For expenses incidental to the administration of justice, four hundred pesos.

SALARY AND EXPENSE FUND.

For commission on cedulas, four hundred pesos; for board of assessors, five hundred pesos; for information fund, two hundred pesos; one thousand one hundred pesos.

In all, for the District of Davao, four thousand three hundred and ninety-five pesos.

DISTRICT OF LANAO.

SALARIES, WAGES AND ALLOWANCES.

Governor's Office: District Governor, twenty per centum of his current proper yearly pay as an officer of the United States Army; one clerk, class A; one interpreter, class B; one messenger, at an annual salary of two hundred and forty pesos: one thousand and forty pesos.

Secretary's Office: District Secretary, at three thousand pesos per annum, seven hundred and fifty pesos.

Treasurer's Office: District Treasurer, class 8; one deputy, class J; one employee, at an annual salary of two hundred pesos: nine hundred and seventy pesos.

In all, for salaries, wages and allowances, District of Lanao, two thousand seven hundred and sixty pesos.

TRANSPORTATION.

For the actual and necessary traveling expenses of district officers and employees, three hundred pesos; for the transportation of freight, one hundred and fifty pesos: four hundred and fifty pesos.

CONTINGENT EXPENSES.

For rent of District offices, court house and jail, one hundred and twenty pesos; for expenses incidental to administration of justice, three hundred pesos: four hundred and twenty pesos.

SALARY AND EXPENSE FUND.

For commission on cedulas, one hundred pesos; for board of assessors, four hundred pesos; for information fund, two hundred pesos: seven hundred pesos.

In all, for the District of Lanao, four thousand three hundred and thirty pesos.

Total appropriation for all purposes, eighty-one thousand nine hundred and thirty-eight pesos and eighty-five centavos, in Philippine currency, or so much thereof as may be necessary.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, July 27, 1904.

Approved by the Philippine Commission September 12, 1904.

[ACT No. 62.]—AN ACT Amending section one of act numbered twelve of the Legislative Council, entitled "An act to provide for the employment of certain subordinate employes in the office of the Engineer of the Moro Province and fixing the salaries thereof."

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Section 1 of act No. 12 of the Legislative Council, entitled "An act to provide for the employment of certain subordinate employes in the office of the Engineer of the Moro Province, and fixing the salaries thereof," as amended by act No. 53 of the Legislative Council is hereby amended by adding thereto the following:

"(c) One draftsman, class D."

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, July 27, 1904.

Approved by the Philippine Commission September 12, 1904.

[ACT No. 63.]—AN ACT Appropriating the sum of twenty-five thousand four hundred and ninety pesos and seventy centavos, Philippine currency, or so much thereof as may be necessary, for certain public works and permanent improvements of the Government of the Moro Province.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums in Philippine currency, or so much thereof as may be respectively necessary, are hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated, for certain public works and permanent improvements of the Government of the Moro Province.

DISTRICT OF ZAMBOANGA.

For repairs to Santa Maria bridge, three hundred pesos; for repair of streets, roads, and bridges in Zamboanga and vicinity, six thousand pesos; for completion of the Moro Exchange, one thousand five hundred and fifty pesos; for bridges over canal, two thousand pesos: nine thousand eight hundred and fifty pesos.

DISTRICT OF SULU.

For completion of "Asturias" Bridge, one thousand three hundred and forty-five pesos and ninety centavos; for repair and construction of wharf, Jolo, one thousand five hundred pesos: two thousand eight hundred and forty-five pesos and ninety centavos.

DISTRICT OF COTTABATO.

For repairs to Parang wharf, one thousand pesos; for repairs to bridge, Parang-Cottabato road, forty-four pesos and eighty centavos: one thousand and forty-four pesos and eighty centavos.

DISTRICT OF DAVAO.

For construction of wharf at Davao, six thousand pesos; for construction and repair of road and bridges, Santa Cruz road, three thousand pesos; for reconstruction of the telegraph line from Davao to Santa Cruz, seven hundred and fifty pesos; for completing repairs to government building, five hundred pesos; for completion of school house, Davao, one thousand five hundred pesos: eleven thousand seven hundred and fifty pesos.

In all, for public works, twenty-five thousand four hundred and ninety pesos and seventy centavos, to remain available until expended.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, August 4, 1904.

Approved by the Philippine Commission September 12, 1904.

[ACT No. 64.]—AN ACT Making additional appropriations for sundry expenses of the government of the Moro Province for the first quarter of the fiscal year ending June thirtieth, nineteen hundred and five, and for other purposes.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The following sums in Philippine currency, or so much thereof as may be respectively necessary, are hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated, in part compensation for the service of the Moro Province for the first quarter of the fiscal year nineteen hundred and five, unless otherwise stated.

GOVERNMENT OF THE MORO PROVINCE.

SALARIES, WAGES AND ALLOWANCES.

Engineer's Office: One draughtsman, class "D", two hundred pesos.

Treasurer's Office: One clerk, class 9, four hundred pesos.

SCHOOL DEPARTMENT.

Salaries: For payment of salary of Cirilo Marquez for services as school teacher, rendered at Siassi during the period from April first nineteen hundred and four to July fifteenth, nineteen hundred and four at forty pesos, Philippine currency, per month, this in addition to compensation received by said Cirilo Marquez from U. S. Army funds for services rendered Military Department as interpreter, the provisions of Act No. 148 of the Philippine Commission to the contrary notwithstanding: one hundrd and forty pesos.

Salary and Expense Fund: For the payment of teachers engaged in teaching night schools under provisions of act numbered seventeen, five hundred pesos.

DISTRICT OF ZAMBOANGA.

SALARIES, WAGES AND ALLOWANCES.

For payment of temporary clerks appointed under the provisions of act numbered fifty-six of the Legislative Council, eighty-nine pesos and fifty centavos.

Total appropriation for all purposes, one thousand three hundred and twenty-nine pesos and fifty centavos, in Philippine currency, or so much thereof as may be necessary.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, August 4, 1904.

Approved by the Philippine Commission September 12,. 1904.

[ACT No. 65.]—AN ACT To provide for the employment of one clerk, class nine, in addition to those provided for in Act Numbered One in the office of the Provincial Treasurer, and fixing the salary thereof.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Subject to the provisions of Act No. 5 of the Philippine Commission and its subsequent amendments, there shall be employed in the office of the Provincial Treasurer, in addition to the employees provided for in Act No. 1 of the Legislative Council, one clerk, class 9.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, August 4, 1904.

Approved by the Philippine Commission September 12, 1904.

[ACT No. 66.]—AN ACT Amending section one of Act Numbered Twenty-one of the Legislative Council, entitled "An act providing for the establishment of the municipalities of Mati, Davao, Makar, Cottabato, Malabang, Dapitan, Cateel, Baganga and Caraga, and enlarging the municipalities of Iligan and Zamboanga."

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Sections 1, 6 and 11 of Act No. 21 of the Legislative Council, entitled "An Act providing for the establishment of the municipalities of Mati, Davao, Makar, Cottabato, Malabang, Dapitan, Cateel, Baganga and Caraga, and enlarging the municipalities of Iligan and Zamboanga," are hereby amended to read as follows:

"SECTION 1. The municipalities of Mati, Davao, Makar, Cottabato, Malabang, Dapitan, Cateel, Baganga and Caraga are hereby established with boundaries as prescribed for each in sections 2, 3, 4, 5, 6, 7, 8, 9 and 10, and the municipalities of Iligan and Zamboanga are hereby enlarged with boundaries as prescribed in sections 11 and 12, all longitudes herein mentioned being referred to the meridan of San Fernando, which is 6 degrees, 12 minutes, 20 seconds west of Greenwhich, a map showing these boundaries being deposited in the office of the Secretary of the Moro Province. The provisions of the Municipal Code now in force in the Philippine Islands, except as hereinafter modified, are extended to the municipalities established by this act."

"SEC. 6. The municipality of Malabang shall include all territory lying north and west of the eastern boundary of the Lanao district, south of the watershed of the mountains which run approximately northwest, following the watershed to its intersection with the meridian 130 degrees east of San Fernando, and east of the latter meridian, including also all the islands within the three marine league limit. The municipal town shall be Malabang."

"SEC. 11. The limits of the municipality of Iligan are hereby extended to include all territory of the Moro Province north of the 8th parallel of N. Lat., and east of the Mipangi River, its boundaries being the 8th parallel of N. Lat. on the south, the waters of the Panquil and Iligan Bays on the west, the

parallel of latitude through Salinbal Point on the north, and the meridian 130 degrees, 38 minutes east of San Fernando on the east. All islands within the three marine league limit shall also be included. The municipal town shall be Iligan."

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted August 4, 1904.

Approved by the Philippine Commission September 12, 1904.

[ACT No. 67.]—AN ACT To prevent the further introduction into the Moro Province of epidemic diseases of large cattle, and to provide measures for the suppression of the present epidemic of such diseases, and making appropriation for the expenses thereof.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. The term "large cattle" for the purposes of this act shall be held to include cattle, carabaos, horses and mules.

SEC. 2. The Governor of the Moro Province is authorized to designate in each district as many employees of the province or district to act as veterinary inspectors as may be necessary, and such veterinary inspectors shall perform the duties imposed upon them by this act without extra compensation. The Governor of the Moro Province may also appoint as veterinary inspectors under this act not more than five veterinarians of the United States Army, who shall receive a per diem allowance not to exceed five pesos, Philippine currency, for each day of service performed by them, or a monthly compensation of not to exceed one hundred and fifty pesos, Philippine currency. Should veterinarians of the Insular Government be temporarily assigned to the province as veterinary inspectors under this act, their salaries for their period of service in the province shall be reimbursed the Insular Treasury from provincial funds. Veterinary inspectors shall perform their duties under the supervision of the Governor of the Moro Province until such time as a provincial board shall have been established, and thereafter under the supervision of the president of such board.

SEC. 3. All large cattle coming into any port of the Moro Province from any other port of the province or of the Philippine Islands, or from any foreign port, shall, subject to the provisions of the customs administrative laws and regulations, be discharged under the supervision of the veterinary inspector stationed at such port, if any there be. It shall be the duty of the veterinary inspector to subject such large cattle to a rigid quarantine for a period of seven days, at a place designated by him, unless it shall be made to appear to his satisfaction that the animals in question have not been recently exposed to any epidemic disease destructive to large cattle either prior to embarcation or en route, in which case quarantine shall not be necessary. Large cattle brought into the province for the use of the United States Army shall be delivered to the proper military authorities for quarantine under their supervision.

SEC. 4. At the end of the period of quarantine, should no symptoms of epidemic disease destructive to large cattle have appeared among the large cattle in quarantine, and should their condition be such as in no way to render liable the spread of any destructive disease among the large cattle of the province, they shall be removed from quarantine and delivered to the person entitled thereto. Should symptoms of epidemic disease destructive to large cattle appear during the period of quarantine, the veterinary inspector shall cause the separation from the other large cattle of all animals showing such symptoms, and shall so isolate them as to guard against the transmission of infection by insects or otherwise. This procedure shall be repeated, if necessary, until the herd in quarantine is pronounced free from disease.

SEC. 5. Large cattle held in quarantine in accordance with the provisions of this act shall be cared for and fed by and at the expense of the owner or person entitled to the possession thereof. Should the owner or person entitled to the possession fail or refuse properly to feed and care for large cattle so held in quarantine, the veterinary inspector shall do so at the expense of the province. The amounts so expended by the province shall constitute a lien in favor of the province upon all the personal property of the owner or person entitled to the possession of the large cattle, which lien may be enforced by the district

treasurer by any method provided by law for the enforcement of a lien arising from delinquent internal revenue taxes.

SEC. 6. When it shall appear to the satisfaction of any veterinary inspector that any large cattle within the district are afflicted with surra, glanders or rhinderpest, it shall be his duty to summarily seize such large cattle and cause them to be killed and the bodies destroyed in such manner as may be prescribed by the Governor of the Moro Province, or the president of the provincial board of health, as the case may be; and such proceedings shall not give rise to any claim, or any cause of action, civil or criminal, against the Moro Province or any of its agents. He shall at once report his action in detail to the district governor, stating the number and kind of animals seized and destroyed and the disposition made of the bodies.

SEC. 7. It shall be the duty of every owner of large cattle and of every person having large cattle in his possession or under his charge, who has reasonable cause to believe that any of such large cattle exhibit symptoms of surra, glanders or rhinderpest, immediately to isolate such animals by confining them in an enclosure to which uninfected large cattle have no access, and to make immediate report thereof to the councillor of his barrio. Failure to comply with the provisions of this section shall be punished by a fine of not lesss than ten nor more than fifty pesos, Philippine currency, or by imprisonment of not more than thirty days, or by both such fine and imprisonment.

SEC. 8. It shall be the duty of the councillor of each barrio to whom a report is made in accordance with the provisions of the preceding section, or who has reasonable cause to believe that any large cattle within his barrio show symptoms of surra, glanders or rhinderpest, immediately to make or cause to be made an examination of the suspected animals. If, in his opinion, such animals show symptoms of any of the diseases mentioned he shall cause the owner or person having charge thereof to isolate and securely hold them by placing them in an enclosure not accessible to other large cattle until the symptoms shall have disappeared, or a veterinary inspector shall have ordered the quarantine removed, or until the animals shall have died or been destroyed; but the period of isolation shall in no case be less than fifteen days, unless otherwise ordered by a veterinary inspector. He shall at once report his action to the municipal presidente, who shall, in turn, report to the district governor. Every municipal officer who fails or refuses to comply with the duties imposed upon him by this section shall be dismissed from office. Every owner of large cattle isolated by order of his councillor or every person in charge of such large cattle who shall fail or refuse to keep such large cattle in isolation during the time and in the manner required by this section, shall be subject to the penalties provided by section 7 of this act.

SEC. 9. It shall be the duty of the owners of large cattle or the person having charge thereof, who shall have reasonable cause to believe that any animal has died of surra, glanders or rhinderpest, to cause the body of such animal to be cremated, or buried at once at a depth of not less than eight feet from the surface of the ground, within the corral or enclosure in which the animal has been isolated during its sickness, if such isolation shall have taken place, unless a contrary disposition of the body shall have been ordered by a veterinary inspector. Such burial must be made at a point at least thirty feet distant from any well, running stream or body of standing water. Failure to comply with the provisions of this section shall be punished by the penalty provided by section 7 of this act.

SEC. 10. District governors shall submit to the Governor of the Moro Province, or to the president of the provincial board of health, as the case may be, a quarterly report concerning the presence of surra, glanders, rhinderpest and other diseases destructive of large cattle in their districts, which report shall set forth in detail the number and kind of animals affected, and the action taken in each case.

SEC. 11. There is hereby appropriated, out of any funds in the Treasury of the Moro Province not otherwise appropriated, the sum of two thousand pesos, Philippine currency, or as much thereof as may be necessary, for the payment of the expenses incurred in carrying out the provisions of this act, including the building of government corrals, the feeding and care of animals in quarantine, the payment of salaries and all incidental expenses. Said sum shall be apportioned to the several districts by resolution of the Legislative Council, and shall be disbursed by the district treasurers as in the case of other funds appropriated for district purposes.

SEC. 12. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage; but no penalty shall be imposed for the

commission, prior to the first day of October, nineteen hundred and four, of any act herein declared to be unlawful, unless the prosecution shall affirmatively prove knowledge on the part of the accused of the unlawful nature of such act.

Enacted, August 17, 1904.

Approved by the Philippine Commission October 7, 1904.

[ACT No. 68.]—AN ACT To provide for the employment of a temporary clerk in the registry of property, and making appropriation for the payment of the salary thereof.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Pending the appointment of a registrar of property for the Moro Province, the Governor of the Moro Province is authorized to employ a temporary clerk to assist the Treasurer of the District of Zamboanga in his duties as acting registrar of property. Such temporary clerk shall receive a compensation not to exceed fifty centavos, Philippine currency, for each hour of service, and may be appointed from suitable persons in the public service, the provisions of act No. 148 of the Philippine Commission to the contrary notwithstanding. This act is made retroactive to authorize the payment of the temporary clerk employed in such capacity since the first day of May, nineteen hundred and four.

SEC. 2. The sum of two hundred pesos, Philippine currency, or so much thereof as may be necessary, is hereby appropriated out of any funds in the Treasury of the Moro Province not otherwise appropriated, for the payment of the salary of the temporary clerk appointed in accordance with the provisions of the preceding section.

SEC. 3. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, August 20, 1904.

Approved by the Philippine Commission September 23, 1904.

[ACT No. 69.]—AN ACT Authorizing the governor of the Moro Province to establish harbor lines for the preservation and protection of the harbors, bays and navigable lakes and rivers of the province.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Whenever it shall be essential to the preservation and protection of the harbors, bays, and navigable lakes and rivers of the province to establish harbor lines, the Governor of the Moro Province may, by executive order, establish such harbor lines, beyond which no piers, wharves, bulkheads, or other works shall be extended or deposits made, except under such regulations as may be prescribed from time to time by him.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect on its passage.

Enacted, August 31, 1904.

Approved by the Philippine Commission September 23, 1904.

[ACT No. 70.]—AN ACT To provide for the employment of one teacher, in addition to those provided for in acts numbered seventeen and thirty-two of the Legislative Council of the Moro Province, in the public school system of the Moro Province.

By authority of the Philippine Commission, be it enacted by the Legislative Council of the Moro Province, that:

SECTION 1. Subject to the provisions of act No. 5 of the Philippine Commission, and its subsequent amendments, there shall be employed in the public school system of the Moro Province, in addition to those provided for in acts numbered seventeen and thirty-two of the Legislative Council of the Moro Province, one teacher of English, class 7.

SEC. 2. Subject to annulment or amendment by the Philippine Commission, this act shall take effect as of July First, 1904.

Enacted, August 31, 1904.

Approved by the Philippine Commission September 23, 1904.

REPORT OF GEO. T. LANGHORNE, CAPTAIN ELEVENTH CAVALRY.

GOVERNMENT OF THE MORO PROVINCE,
OFFICE OF THE SECRETARY,
Zamboanga, P. I., August 6, 1904.

SIR: I have the honor to submit the following notes of my trip to Sarawak, Java, and the Federated Malay States, made in compliance with the wish of the civil government:

As previously reported to you, I left the *Sabah* at Labuan on June 11, the *Sabah* then returning to Zamboanga.

LABUAN.

Labuan is an island about 6 miles off the northwest coast of Borneo. Its name is the Malay word for "anchorage," as it has a fine harbor on the south side. Its area is about 31 square miles and population about 8,500. It was ceded to Great Britain by the Sultan of Borneo in 1846 at the instigation of the first Rajah of Sarawak, being at that time uninhabited. Its first governor was the late Sir James Brooke. Extensive coal mines are now being developed, the annual export being about 50,000 tons. Labuan is a Crown colony, but the government is administered by the Government of British North Borneo. There is a well-built town. Most of the shops are run by Chinese. Its trade consists in the exchange of cloth, rice, earthenware, brassware, etc., for india rubber, birds' nests, canes, bêche-de-mer, wax, sago, etc. Sago is being converted into flour for export to Singapore.

There is on the island a cable station of the Eastern Extension and Australasia Telegraph Company, which have a nice establishment, good houses for the manager and assistant manager, club houses, tennis courts, etc.

The towns and roads are fairly kept. There is a British resident of the British North Borneo Company, with several assistants, a magistrate, and a postmaster. The coal mines are 7 to 9 miles distant. The coal is brought in on a railway to good iron wharves which have been lately constructed. Many ships touch here for coal. The residences of the Europeans are on high ground about a mile and a half northeast of the town, well laid out and kept, as are also the grounds of the Eastern Extension and Australasia Telegraph Company. The governor's house is comfortable, a large bungalow surrounded by a well-kept park.

There are excellent stores in Labuan. Many tinned goods are sold, some of them American.

For this year $5,000 were allotted for the maintenance of roads and bridges.

The public revenue in 1902 was $56,104; expenditures, $68,785. Imports, $1,948,742; exports, $1,998,945.

The British resident, Mr. W. H. Hasting, was very cordial and hospitable.

BRUNEI.

Opposite Labuan, on the mainland, is the large town of Brunei, with a population of 7,000. Most of the houses are built over the water. The town and 3,000 square miles of country about Brunei is about all that now remains under the control of the Sultan of Brunei.

There is a cutch factory at Brunei, which is paying very well. Cutch is the product obtained from the bark of the mangrove tree; it is shipped in sacks. It is used for dyeing, and gives the best khaki color.

Handsome brass work, bowls, jars, etc., and very handsome silk sarongs embroidered in gold and silver are made at Brunei. Some of the brass kettles sell for 80 and 100 pesos; the good sarongs from 20 pesos up to 200 or more.

Rajah Brooke and British North Borneo have gradually absorbed all the rest of the island, for which they pay small annuities. At Brooketon, northeast of Brunei, Rajah Brooke has established coal mines, which he is working at a loss of about $100,000 per year.

There is no regular nor direct communication with Kuching from Labuan, so I proceeded to Singapore and took the *Rajah of Sarawak* on Tuesday the 17th. This boat is subsidized by the Sarawak government for carrying mails. It is splendidly kept, excellent table and accommodations for first-class passengers, very good saloon and accommodations for second-class passengers, mostly rich Chinese, and large and clean accommodations for the deck passengers, of whom there are a great number, mostly Chinese.

SARAWAK.

Arrived off the coast of Sarawak in the afternoon of May 19, Thursday, and anchored at the mouth of the Sarawak River about 2 p. m. to await the high tide. At 3 p. m. proceeded up the river, arriving at Kuching at 4 p. m.

Dr. A. T. C. Barker, the principal medical officer, who came down to inspect the ship, invited me to stay with him and entertained me most hospitably.

Kuching is a very pretty little town of about 6,000 inhabitants, with clean streets. The houses of the Chinese portion are all of brick, generally with galleries over the sidewalks. The Europeans live in comfortable and well-kept residences on the surrounding hills. There are some 47 miles of metaled roads and streets in and about Kuching, which are very carefully looked after, their upkeep costing about $43,000 annually. The premises about the buildings are clean and the hedges and lawns are neatly trimmed, and the whole makes a delightful impression.

Sarawak is one of the most interesting countries of the world. It is a narrow strip of country traversed by many large and magnificent rivers, which are the highways, hence there are very few roads. Its territory lies on the west coast of Borneo, with a seaboard of 400 miles, an area of 50,000 square miles, population of about 800,000, composed of various races, the best known being Malays and Dyaks. Of the Dyaks especially there are several tribes.

The government of the district of Sarawak was obtained from the Sultan of Brunei by the late Sir James Brooke in 1841, who became so well known as Rajah Brooke of Sarawak. Other concessions were made in 1861, 1882, 1885, and 1890, when the Limbang River, which is north of the town of Brunei, was obtained, thus leaving only a small triangle controlled by the Sultan of Brunei, as referred to above. For all of these concessions the government of Sarawak pays an annual tribute or compensation of 15,000 pesos to the Sultan of Brunei. The government is a mild sort of despotism, the Rajah being supreme ruler. I called to pay my respects to the present Rajah, Sir Charles Johnston Brooke, G. C. M. G., who succeeded his uncle, Rajah Sir James Brooke in 1868. He was very courteous, and, among other things, spoke of his visit to the Philippine Islands. He has been to Manila and to Zamboanga. He said he considered the Philippines the most beautiful and fertile islands in the world.

He has four sons, the eldest of whom, Charles Vyner Brooke, the Rajah Muda, is there, and has been for many years an official of the country and for some ten years past the resident of Rejang district. Since my visit he has been relieved of duty as resident and has been ordered to Kuching to take charge of the government during the absence of the rajah, who is to return to England in September, and who will probably gradually turn over the reins of the government to the Rajah Muda.

The rajah is a very courteous gentleman of 76 years. His excellent physical condition is proven by the fact that when in England he still rides to hounds about three times a week during the hunting season.

The laws are issued in the form of orders; for example, orders of his highness the rajah, orders of the supreme council, orders of the committee of administration, orders of the officer administering the government. The council consists of the rajah, the senior resident, one or two other Europeans, and about four native chiefs. There is also a supreme council, consisting of all the important chiefs and several European officers, which is convened about once in three years. The country is divided into a number of districts and subdistricts, each under British officials, residents, and assistant residents. The policy of the two rajahs has been to administer the affairs of the country entirely for the benefit of the natives. The officials of the government have been selected as a rule from among sons of friends of the rajah. They come out to serve twenty or thirty years. The pay is rather small, but at the end of their service if satisfactory they are pensioned. Great authority is exercised by the residents and subdistrict officers, especially in those places remote from Kuching. The government is paternal in the extreme. All of the officers are required to pass examinations in law and in Malay and are expected to learn the native dialect when at an outstation. Malay is the language of the courts. Most of the officers of the government are magistrates as well as administrative and executive officers, which system works well, as the natives prefer to appear in court before Englishmen. By far the greater portion of the laws of the country are unwritten, as also the powers delegated to the officials. For the sixty-three years of government the public laws are very few indeed.

There is an official gazette published monthly and through it laws or orders, rules and reports of various kinds are made known.

There is a supreme court, consisting of the rajah (in his absence his representative) and four chiefs. There are also English magistrates courts and native courts.

One of the resident officers who has been twenty-seven years in the country, Dr. Charles Hose, is said to speak 17 or more native dialects. He has been for a long time resident of the Baram district, and has just been relieved to succeed the Rajah Muda as resident in the district of the Rejang. In turning over his charge he reported that in the last ten years there has not been a single murder in his district, which includes an area of about 10,000 or 15,000 square miles.

The revenues for Sarawak for 1902 were $1,192,039, the expenditures $1,139,287. Imports $4,959,720, exports $6,796,588. The exports consist largely of sago, gutta-percha, india rubber, beeswax, birds' nests, gold, silver, diamonds, antimony, quicksilver, cutch, tobacco, rice, rattan, coal, gambier, and pepper.

The officials of the government consider that its development and prosperity are due in a large measure to the Chinese, who are the principal merchants of the country, and at each residency and settlement of any size they have well-built bazaars, generally of brick. They estimate that each Chinaman brings in about $10 yearly revenue to the country, due mainly to opium.

Sarawak pepper now has first place in the markets of the world. It is grown principally on the Sarawak River, where there are some 15 to 20 miles of gardens, worked almost entirely by Chinese, under various systems. In starting they generally are backed by either other Chinese or commercial interests. Generally after a few years they become the proprietors of their gardens, although the title to the land remains with the state, and they pay a small land rent.

The principal commercial concern of the country is the Borneo Company, which has its headquarters in Kuching. The center for the pepper industry is at Busa. The company works two cyanide gold plants, one at Bau and one at Bidi, all on the Sarawak River. The Borneo Company has a large concession. These concerns now pay very well, although much money was lost until the cyanide plants were established. The gold is found in a low grade ore, generally in pockets, about Bau and Bidi. The two plants are now well run under the charge of competent managers, and have a capacity of 8,000 to 10,000 tons each per month. The total amount of gold reported as exported from the country in 1903 was 52,517 ounces.

The officers of this company are very well paid and many comforts are provided for them. The managers have large and commodious houses, well situated on hills near the works. Their assistants have comfortable bungalows. At each place is a club, billiard tables, tennis courts, at one bowling alleys, at the other a training course for racing ponies 4 miles through the jungle, all supplied by the company. There are beautiful lawns about the houses, with well-kept grass and flowers. At Bau, Malays and Dyaks are used in the workshops as mechanics and engineers, as well as Chinamen. At Bidi there is a large Malay village built by the company, with very good houses made of nipa with wood floors. These houses are as good as many furnished our officers in the Philippines. Malays are used there to a greater extent than at Bau. Chinamen are used for the mining, and generally lay down the ore at the mills at a contract price. At both places tramways are used, with small mining cars. At Bidi small locomotives are used. These places are in a limestone district, abounding in pretty scenery, caves, etc. The use of the Malays and Dyaks as machinists is very interesting, as it shows what can be accomplished by care in instructing them. Of course all of the officials speak Malay.

On the coast near one of the mouths of the Sarawak River there is a cutch factory which has more orders for cutch than it can fill. The manager said that one American firm ordered more than his annual output.

Those officers of the government who are over districts where Chinese predominate speak Chinese, just as in the other districts the officials speak the dialects of the tribes of the respective districts. This results in giving the natives great confidence in their white rulers, as they can speak directly to them, thus eliminating interpreters, who are the source of many misunderstandings.

The public works department cost, in 1903, $162,891.12, and its management is relatively expensive. The chief engineer, a practical man, is a Canadian under contract at 8,000 pesos. He has three assistants at from 300 to 500 pesos per month each. There is a very good, though small, waterworks system at Kuching, to which is attached an ice plant. The engineer, firemen, etc., are Malays. There is a splendid wood for building purposes, especially for houses, called bilian. It resists the weather and ants. It is somewhat brittle, but splits easily and makes excellent shingles. A hole must be bored before driving a nail into it. The church at Kuching was built of bilian in 1837 and is in a good state of preservation now.

The Sarawak government has a number of coasting steamers, the rajah's yacht, and several launches, which are officered and manned by Malays, except usually a white chief engineer for the largest boats. All officers and travellers are enjoined to uphold the dignity and authority of the native captains of these vessels. Attention is invited to the comparatively small cost for the running expenses of these boats, as shown by the extracts from the treasurer's report given below. A new vessel, the *Alice Larraine*, a boat about the size of the *Borneo* (125 tons) has just been completed at Kuching.

The rajah is having built at Kuching a slip or marine railway, which will take a vessel of 600 tons. It is not thought to be a wise movement, but rather an expensive one. A 15-ton crane was purchased by the rajah and put up on the river bank. It has been used but once, to lift the boilers from the hulk of an old yacht to the *Alice Lorraine*. The work of setting up the crane cost about 7,000 pesos, and some 12,000 pesos must now be spent to prevent its falling into the river.

There are many schools, mostly for teaching the vernacular, and they are considered satisfactory. English is also taught.

There is a large, good hospital at Kuching, which is taken advantage of by the Chinese more than by the natives. The latter, however, are more and more availing themselves of

its advantages. The medical department is under the very able Dr. A. J. G. Barker. Hospital attendants and stewards, called dressers, are generally Chinese. These are taken on as apprentices at a very low wage per month and their wages are increased as they become proficient. The best and most trustworthy dressers are sent to the outlying residencies, where they are placed in charge of small hospitals and dispensaries.

The court-houses are well built, open buildings. The court rooms have judge's bench, prisoners' box, etc., and seats for spectators. The rajah sits in the supreme court with his native assistants each morning in Kuching. Courts are held all over the country by the white magistrates who give notice of their arrival or hold courts at regular hours at the places of residence. The means of execution is the kris.

The following extracts from the treasurer's report for the year 1903 may be of interest:

RECEIPTS.

Courts of justice:		
Fees and fines—		
General courts		$59,527.70
Datu's courts		834.82
Probate duties		2,862.31
Post and shipping office		8,007.07
Naval department:		
P. S. Adeh, freights and passengers		17,809.07
P. S. Kaka		31,406.75
S. L. Lucile		1,095.83
S. L. Gazelle		2,488.48
S. L. La Fee		5,390.58
Engineer's workshop		16,170.27
Public works:		
Lighting rate		2,420.90
Water rate		4,486.72
Market dues[a]		7,152.00
Ice machine		3,098.50
Telephones		5,921.19
Rents		1,623.50
Road tax		2,962.33
Miscellaneous		4,251.60
Waterworks, sale of material		527.58
Opium	$223,806.00	
Arrack (liquor)	55,951.50	
Gambling	111,903.10	
Pawn	7,038.00	
		398,718.60
Collection of revenue:		
Customs—		
Import duties		152,352.56
Export duties		330,184.36
Mining royalties		118,643.22
Land revenue		22,638.62
Internal revenue, stamps		14,185.40
Plantations:		
Matang estate, sale of coffee	2,716.62	
Satang estate, sale of oil	2,215.20	
Miscellaneous plantations	633.77	
		5,565.59

EXPENDITURES.

Courts of justice:		
General courts—		
Establishment	$23,118.70	
Other charges	14,060.98	
Datu courts—		
Establishment	6,924.00	
Other charges	52.27	
Police	32,828.36	
		76,974.61
Post and shipping office		10,485.27
Prisons		22,420.92

[a] These probably include charges against the government. For instance, each official telephone $25 per annum.

Medical:		
Establishment	$12,050.26	
Medicines	8,625.67	
Instruments, etc	31.60	
Other charges	3,405.74	
General hospital	6,771.17	
Pauper hospital	3,133.60	
Lock hospital	166.90	
Leper hospital	465.40	
Cholera hospital	350.79	
Sadong hospital	2,128.37	
		$37,120.50
Naval department:		
H. H. S. Zahara (rajah's yacht)		10,256.89
P. S. Adeh (paddle coasting steamer)		19,808.67
P. S. Kaka		26,497.11
S. L. Lucile		4,363.25
S. L. Gazelle		5,181.99
S. S. Larna Doone		2,738.37
S. L. Young Harry		2,524.42
S. L. La Fee—[a]		
Pay and rations	2,253.67	
Stores	722.69	
Docking and repairs	1,758.26	
Fuel	1,938.51	
Agent's commission	258.98	
Miscellaneous	41.68	
		6,973.79
Engineer's workshop		27,322.00
Public works, including—		
Management		11,871.61
Upkeep of roads		46,623.36
New roads		31,133.63
Ornamental grounds		6,831.51
Waterworks, sale of material		162,891.12
Military		86,264.45
Museum		6,183.60
Plantations:		
Matang estate	23,878.75	
Satap estate	430.23	
Satang estate	1,205.68	
Palm oil estate	245.89	
Miscellaneous plantations	113.07	
		25,873.62
Civil list:		
His Highness the Rajah—		
Privy purse	56,701.17	
Residence (Astana)	15,185.85	
		71,887.02
His Highness the Ranee		51,709.18
His Highness the Rajah Muda (heir)[b]		4,038.62
His Highness the Tuan Muda (second son)		15,401.51
His Highness Tuan Bunsu (another son)		4,018.29
Residency at Sarawak:		
Establishment	11,554.00	
Other charges	1,170.29	
		12,724.29
European officers (out stations)		55,013.88
Treasury:		
Establishment	11,135.08	
Other charges	2,777.35	
		13,912.43

[a] Expenses of S. L. La Fee itemized by way of illustration.
[b] In addition the Rajah Muda is paid as a first-class official of the government.

JAVA.

From Sarawak I returned to Singapore, and sailed on the 7th of June for Batavia. Arrived at Tanjong Pryok, as the port of Batavia is called, about 10 a. m. There is here an exceedingly well arranged little harbor, protected by breakwater, with good piers that accommodate about fifteen vessels of large size. The harbor has many buoys and a large floating dry dock. The railroad station is very clean, with its white and patches of green, well kept fences and lawns. Tracks are alongside of all the large warehouses in connection with the docks. It is 7 miles to Batavia proper. The railroad parallels the canal and the good road and towpaths, with their rows of shade trees.

The old city of Batavia has narrow streets, with the exception of one or two, very good government buildings, small in number for the size of the place, and several open parks. The river is walled up to look like a Dutch canal. Wherever there is room there are fine shade trees—along the canal stretch avenues of them. The houses appear freshly whitewashed, and have red tiled roofs.

There is a tramway as well as the railroad up to Weltervreden, the residential suburb of Batavia. Weltervreden is like a large park, with its beautiful streets and trees. The buildings are separated by fine lawns, and each street is an avenue of handsome shade-trees. The flowers and the decorative plants and trees in the yards give a very pleasing aspect. The handsome stores and club buildings and the well kept hotels all add to the charming effect. The Dutch houses have but one story. The floors are either of Italian marble, costing about $2.50 per square yard, or of ornamental tiles or cement. The roofs are of red tile.

The Harmony and the Army and Navy Club (the Concordia) buildings are very large, with Italian marble floors and extensive grounds about them. They were built by the government.

The Chinese occupy a separate quarter, which is a series of streets of bazars, full of business. The natives fill another section of the town, which has trees and flowers rather than business.

For the encouragement of native industries a number of philanthropists have built, just back of the Harmony Club in the most convenient part of Weltervreden, a large and handsome store, well lighted by large plate-glass windows. There are displayed for sale all kinds of articles of the native industries. The hand-painted sarongs, of which almost each district has its peculiar pattern, cutting and thrusting weapons of all sorts, with ornamental handles and blades, gold and silver ornaments and vessels, some of them very artistic, a great deal of brassware, wood carving, matting, etc. There is one piece of wood carving about 12 to 14 feet high and 20 to 24 feet wide, which is well done, and priced at 3,000 guilders. There are numerous other articles impossible for me to enumerate. The residents, controllers, and other government officials all over the archipelago encourage in every way the natives to make and send on samples of their work. These are sold at two to three times the price for which they can be bought at the places where they are made, so that the philanthropic business must be a very lucrative one, but as these articles are sold mostly to tourists, the idea is excellent, and much good is done the natives.

Everyone arriving in Java or the Dutch Indies must present himself within three days to the resident or assistant resident nearest his port of entry to obtain permission to stay or to travel in the country, paying a small fee for the passport which is furnished him.

I went from Batavia to Buitenzorg, the capital city, which is south of Batavia in the mountains, at an elevation of 1,000 feet. Here are situated the well-known botanical gardens (started by Sir Stamford Raffles), the best arranged in the world.

The governor-general gave me an audience, and kept me for over an hour, talking with great frankness about the country and asking questions about these islands. He broached several subjects of interest to us, and in that manner gave me an opportunity of speaking about the possible chance of obtaining Javanese laborers as colonists for Mindanao. The population of Java and Madura, a small littoral island opposite Surabaya, is about 30,000,000, and is increasing at the rate of 600,000 per year. Soon Java will be much overpopulated, and the officials are making strenuous efforts to send people to other islands, and in this they are making good progress. The Javanese are also permitted to emigrate to the Malay Peninsula, Mauritius, New Caledonia, and other eastern colonies in large numbers, under the strictest agreements as to their proper care, sanitation and return to Java, should they so desire it, at the end of the period contracted for, generally three to five years. In such cases many of the Javanese elect to remain in the new colonies, which is satisfactory to the Dutch Government. When asked if the same thing could be done with regard to these islands, he replied that it could be easily arranged. When asked if it were possible to obtain Javanese to come as permanent settlers to the Philippines, he said that it was not permitted at present by instructions from his home government, but that he was authorized to make a dispensation (the word he used), that is, to waive his instructions and to permit the Javanese to come as permanent settlers to Mindanao, provided, of course, an agreement

should be signed assuring them of proper sanitary care, and protection against the still wild tribes, such as Moros, and he seemed pleased with the idea, which appears to me to be a vital question for Mindanao. He spoke of the question of forced labor, and the remarkable results that had been obtained in Java by the use of it, also of the so-called culture system, both of which are not now carried on to such an extent as formerly. He asked me to dinner that night, where the conversation on such subjects was continued.

I called on the general secretary for the colonial government, Mr. Nederburg, who is said to be the best informed man on colonial literature in the East and has built up a very good library. Unfortunately, most of the publications are in the Dutch language, which is little known except by Dutchmen, and thus the general world is deprived of a great deal that is of interest. He gave me letters, by direction of the governor-general, to residents throughout the island, directing that every courtesy be extended to me during my visit. I found the Dutch officials very pleasant. Of course most of them speak well four modern languages and in addition all speak Malay, and most of them speak high and low Javanese, or the dialect of the tribe to which they are assigned for duty.

The scenery about Buitenzorg is fascinating. There are good drives in every direction. The streets, like in every place in the island, are good and clean, with shade trees all about the towns and along the roads and paths, and even through the fields are rows of shade trees.

Java is covered with fine roads, magnificent shade trees abound, and splendid agricultural industries have developed the island, and in different localities there are crops, fruits, etc., that are suited for each. In this manner coffee, cocoanuts, rubber, tea, sugar, rice, and other cultures were inaugurated and put on a firm and paying basis, hence the prosperous condition of the colony.

The government railroads have been extended from Batavia to Soerabaja and are now being built in other directions across the island, all paid for out of the revenues of the country. They are well constructed, with stone and iron bridges and culverts. The many merchants and planters desire the government to raise a loan for the rapid construction of much needed railways, but as yet Holland has refused to sanction such a loan. The locomotives are run by native or half-caste engineers. There is a parapet or railing for every bridge or culvert, however small, both on the roads and the railway, with the number and name printed on the railing. All are kept freshly whitewashed or painted.

Each town or village has a pretty park or central square, with a good lawn, grass closely cut, and surrounded by handsome shade trees, generally the *ficus elastica*. About this square is the house of the resident, or assistant resident or controleur, or if there be no Dutch official the house of the regent, wedowen or other native chief, the schoolhouse, the jail, and police station. Most of the houses are roofed with tile, many built of stone or brick. All houses in Java are whitewashed, as are the stonewalls, fences, gateposts, mileposts, etc.

Garoet is a mountain town in mid Java, at an elevation of over 2,000 feet. A branch of the railroad runs to it. The scenery there is grand; magnificent volcanic mountains towering to 8,500 feet surround the place. Many satisfactory excursions can be made from here, one to the old crater of Papandayan, one to Talaga Bordas, a white lake, are especially interesting to one studying the government. The main metaled roads are filled with people moving to and from the markets. Where the roads cease, well ditched bridle paths, through plantations of tea, coffee, and quinine, wind up the mountains. In many places steps are made where the grades are steep. The views are exquisite, overlooking the beautiful cultivated valleys and paddy fields ingeniously built up, even to the tops of high mountains. The people are naturally polite and the Dutch have not attempted to change their customs, even though in many cases this politeness descends to cringing servility. The courtesies are the same that are extended to the native chiefs and members of the royal family, and are accepted as due to a superior race, and the respect is willingly paid by the natives. Among the Javanese those of higher rank sit on the floor in one way, while those of the lower ranks must sit in a different way. Formerly in Java only those of high birth could wear cloths of certain designs, but now any that can pay for sarongs of any make may wear them. Solo-karta and Djokjakarta, called "Solo" and "Djokja," are the seats of native princes and are run on the same principles as are the native States in the Malay Peninsula. There is a Dutch resident and assistant resident and controleurs, as in other places, but the laws are issued in the name of the sultan of Solo, or of the native prince Mangkoe Negoro, of Djokja. The incomes of these princes are about 150,000 to 400,000 guilders annually. They live in Kratons, surrounded by large followings, and have no difficulty at all in spending upon their women, dresses, guards, etc., the relatively large incomes that they receive. Their residences are handsome, built by the government, with courts of honor, fine inclosures, state elephants, sacred and other trees. Other high chiefs also have large comfortable residences.

As much indigo is grown in the central provinces the clothing of the lower classes is generally blue. These regions are very populous and the streets and roads are thronged. In this district are the old Hindu ruins so often described, which were marvels of ancient industry and architecture.

Mr. C. R. Couperus, the resident of Solo, is much interested in the native industries and is trying to revive the ancient way of manufacturing "des armes blanches." Some of the brass, gold, and silver work, the manufacture of which is encouraged, is particularly pleasing and artistic, also unique fans made of carabao leather, with handles of carabao horn, sarongs, etc. He asked me to send him samples of work of the Filipinos and stated that in return he would like to send me samples of Javanese work. I mention this as some other official of this government might well wish to correspond with him.

Another great industry of this section of the country is sugar. There are many estates which are worked as a trust, the Agricultural Bank at Samarang advancing money when necessary. It does the buying of material and the selling of the products in a large measure. Mr. C. C. Zeveryn is the manager of the Agricultural Bank and also the general manager of a stock company owning seven or more "centrals." He was very courteous and invited me to see several of the mills. The shortness of my stay enabled him to show me only one, about 6 miles from Djokja. We drove there in a coach, over a good road, by numerous vegetable gardens, much rice and peanuts, and through large tracts of sugar cane. Before the railroads were established travel was by coaching with two to four horses, with changes of post horses every few miles. One such station, with a tiled shed over the road, we passed on the way to the mill. The sugar plant was well run and has a capacity of 500 tons of cane per day. They have three Belgian presses, getting out 92 per cent of the sugar and some 80 per cent of the weight of the cane. The bagasse goes at once to the furnaces well dried. This mill was made over and the presses were faced the wrong way to have the bagasse carried to the furnaces by mechanical conveyor, hence it is carried in large baskets by hand. Dry leaves of the sugar cane are brought from the fields and also burned. The cost of fuel, including labor, for running the plants is 5 cents Mexican per picul (133 pounds), of cane. The engines are all English; the vacuum pans are German. The plant is very clean, with cement floors. Most of the sugar goes to the United States, and it is made so cheaply that it can still be sold there at a profit after paying the tariff. Some years ago a disease called "sere" attacked the sugar cane in the lowlands and made it all go to leaves, so that now the cane is planted in the mountains, where in about fourteen months it grows to the height of 10 to 15 feet. There it will produce little or no sugar, so it is cut in lengths of about 3 feet, brought down to the plains, again cut to a length of about 1 foot, and planted. Although this frequent rehandling is comparatively expensive, still it pays. There are three kinds of cane in general use—that above described, the black Manila, and the yellow Manila. They are now trying a new cane, which is a cross between the native and the yellow Manila. The laborers are paid 0.20 to 0.50 guilder per day. A great deal of sugar is grown about Solo, Djokja, and Samarang and in east Java. In the sugar districts the planting season and the cutting season are the same, hence double the number of cars are required on the railroads than would otherwise be needed. About the cities are grown vegetables and peanuts. In the parts of the country where rice is grown but one crop a year can be obtained. After it is gathered the rice paddies are made by hand into vegetable beds, about four to each square, which will permit of irrigation, the natives using large hoes with a blade about 18 inches long and 6 wide. Vegetables are then grown until the rice-planting season again comes around, when these beds are torn up and the dirt leveled in the squares.

In the forests, of which a large number still exist in Java, when trees are cut down others are planted in their places; especially is this true of the teak, of which there are large and new forests between Solo and Samarang.

The quina plantations of Java produce one-half of the world's output of quinine. The tree is not native, but imported, after great expense, from Peru. It might be worth trying for the hill country of Mindanao and Luzon.

The suzerain of Solo sends all of his children to Dutch schools, some of them to Holland. All the native children who go to school with the Dutch children in Java wear European dress in school, but as soon as they return to their homes they change to their native dress. The day after I left Solo the prince there was to go with a large retinue to what was called his chateau in the southern part of Java. There he was to indulge in large game shooting—tigers, wild buffalo, deer, etc.

Samarang, with only an open roadstead, is the third port of importance in Java. The American Oldsmobile is being introduced there, and, I believe, is giving satisfaction. The roads of Java should make the auto a very popular and useful vehicle.

The towns are governed from Batavia. Many of the merchants and planters are in favor of some sort of a municipal government.

The impression I received during this short trip was of the small number of officials and public buildings and the large amount of government. The influences of the government are felt everywhere. The French writer, Chailley Bert, remarks that Java is too much governed. In every case, however, when I asked about some law or custom which he had criticised, the reply was that a change had been made or that some change was under consideration for the improvement of the condition mentioned. One must remember that all

that is done in Java is for the best interests of the people. All natives are kept busy at work and appear to be happy. There seems to be a sufficient number of schools for all that wish or are made to attend. The sons and daughters of the better and more progressive of the people are given the same advantages that are given the Dutch children. In fact, the education that is given by the government seems to be equal to the capacity of the people. "Malay, the volapuk (lengua franca) of the East," is taught in all the schools in addition to the native dialects, and Dutch is taught in many of them. The schoolteachers are well paid, especially the European ones.

In the so-called "culture system" the government designates what shall be planted by the people in any given community, such as coffee, tea, etc., due regard being had to the nature of the soil and the character of the inhabitants. The natives were required to sell their products to the government at prices less than the market price, and the government thus made a profit, which was only a fair return for the cost of the instruction given, the irrigation system, the necessary roads, etc. In this manner coffee, cocoanuts, rubber, tea, sugar, rice, and other cultures were inaugurated and put on a firm and paying basis; hence the prosperous condition of the colony.

The Dutch East Indies is divided up into a number of districts, each with its resident, assistant resident, and controleurs. This is the English system introduced in Java by Sir Stamford Raffles, but now carried on in a manner more compatible with the Dutch character. The controleurs are stationed in small places and travel about their subdistricts advising the native headmen, who are called by various names. Certain native officials are elected by the inhabitants. The Dutch are very kind to the natives and remember to consider their feelings and their many customs and superstitions. In fact, they study these in order to humor the natives, and go so far as to follow the customs in many ways, such as having official umbrellas, etc. They have much intercourse with the natives and keep them well up to their work. Much use is made of the hereditary rank of the native chiefs. Formerly only these used to be made headmen, according to their rank by birth, but now the endeavor is to select the best men for positions, with less regard for birth.

The frequent inspections and constant traveling of the Dutch officials result in much neatness and cleanliness, not only in the public roads, parks, etc., but in private houses and inclosures. The fields and plantations are like the nice gardens in Europe. From books on the Dutch East Indies one learns that there is much difference between the many different tribes; that the natives are proud of their tribal distinctions and faithful for the most part to their own chiefs, but that the extension of the governmental system of Java to the other islands is resulting in gradually turning them into well-ordered communities where prosperity reigns and protection for life and property prevail.

FEDERATED MALAY STATES.

On my return to Singapore from Java, Mr. Oliver Marks, secretary to his excellency the high commissioner, and the governor of Singapore, furnished me with letters to the various residents and a number of district officers in the Federated Malay States. He presented me to his excellency the high commissioner, who was cordial, and they both seemed anxious that every courtesy should be extended to me. I had letters of introduction to Mr. Marks.

Some remarks on the history, etc., of the Malay Peninsula might not be inappropriate here. Much of the information that follows is taken from the Federated Malay States Handbook, Whitaker's Almanac, the Official Colonial List, and various reports published in the native states.

On the south and west coast of the Malay Peninsula are the British Crown colonies—Singapore, Malacca, Dinding, Port Wellesley, and Penang, the first and last named being islands. These constitute the Straits Settlements, with the seat of government at Singapore. The Keeling Islands, a coral group in the Indian Ocean, is a dependency of the Straits Settlements. Christmas Island was annexed to the settlement of Singapore in 1900. The population in 1901 of the Straits Settlements was 572,249, of which Singapore claimed 228,555.

The government consists of a governor and an executive council of 8 members, and a legislative council of 8 official and 7 unofficial members appointed by the Crown. Two of the unofficial members are nominated by the chambers of commerce at Singapore and Penang.

At the extremity of the peninsula is the independent state of Johore, which, however, is under the protection of Great Britain and in time may have a closer relation.

Northwest of Johore, on the Straits of Malacca, are the three native states of Perak, Selangor, and Negri Sembilan, west of the mountain divide through the peninsula. North east of that divide is the native state of Pahang. These four form the Federated Malay States by an agreement which was signed in July, 1895, by which these states were federated for administrative purposes and a resident-general appointed with an official residence at Kuala Lumpur, Selangor. The following is the agreement:

"Agreement between the governor of the Straits Settlements, acting in behalf of Her Majesty the Queen, Empress of India, and the rulers of the following Malay states, that is to say, Perak, Selangor, Pahang, and the Negri Sembilan.

"1. In confirmation of various previous agreements the sultan of Perak, the sultan of Selangor, the sultan of Pahang, and the chiefs of the states which form the territory known as the Negri Sembilan, hereby severally place themselves and their states under the protection of the British Government.

"2. The above-named rulers and chiefs of the respective states hereby agree to constitute their countries a federation, to be known as the Protected Malay States, to be administered under the advice of the British Government.

"3. It is to be understood that the arrangement hereby agreed upon does not imply that any one ruler or chief shall exercise any power or authority in respect of any states other than that which he now possesses in the state of which he is the recognized ruler or chief.

"4. The above-named rulers agree to accept a British officer, to be styled the resident-general, as the agent and representative of the British Government, under the governor of the Straits Settlements. They undertake to provide him with suitable accommodation, with such salary as is determined by Her Majesty's Government, and to follow his advice in all matters of administration other than those touching the Mohammedan religion. The appointment of the resident-general will not affect the obligations of the Malay rulers toward the British residents now existing or hereafter to be appointed to offices in the above-mentioned protected states.

"5. The above-named rulers also agree to give to those states in the federation which require it such assistance in men, money, or other respects as the British Government, through its duly appointed officers, may advise; and they further undertake, should war break out between Her Majesty's Government and that of any other power, to send, on the requisition of the governor, a body of armed and equipped Indian troops for service in the Straits Settlements.

"6. Nothing in this agreement is intended to curtail any of the powers or authority now held by any of the above-named rulers in their respective states, nor does it alter the relations now existing between any of the states named and the British Empire."

Higher up on the peninsula, north of these four states, are other native states of Kedah, Trengganu, Kelantan, etc., to the Siam border.

There is an agreement between Great Britain and France for British control over these states, and they will probably in the near future be brought into the confederation.

The population of the Federated Malay States by the census of 1901 shows approximately 665,000.

The total area of the four states is estimated at 27,000 square miles.

In 1874 the internal strife in Perak and Selangor was such as to cause the intervention of the then governor of the Straits Settlements. Acts of piracy committed by the Malay gave him the opportunity he desired. At the requests of the sultan of Perak and the chiefs of Selangor, Sir Andrew Clarke, R. E., G. C. M. G., then governor of Singapore, appointed officers of the Straits Settlements, calling them British residents, to advise the rulers of these native states respecting the collection of revenue and general administration. The first of these appointed, Mr. J. W. W. Birch, was murdered by the Malays in November, 1875. A force sent to apprehend the murderers was resisted, and it became necessary to bring troops from India and China to obtain redress and secure order in the state. All of the murderers were arrested and punished, but as it was ascertained that many of the chiefs had instigated or been privy to the crime, it was found necessary to banish the sultan and three chiefs to the Seychelles, while the ex-sultan was sent as a prisoner to Johor. Another British resident was appointed and since then peace has been maintained. Those two states, when the initial difficulties had once been overcome, progressed with unusual success. A small staff of officers was furnished the British resident. Justice was everywhere obtainable at the hands of European magistrates. The revenue, at first very small, has rapidly increased, and countries noted for robbery on land and piracy at sea are now centers for the development of profitable trade. A few years later the strife existing between the small states going to make up Negri Sembilan was such that they requested a resident to assist and guide them. The Malay words "negri sembilan" mean "nine states." The head of the federation of these smaller tribes in Negri Sembilan is called "yand-di-per-tuan."

In 1868 a boundary dispute between Pahang and Johor was settled by arbitration by the then governor of the Straits Settlements, Sir Harry Ord, thus creating on the part of Pahang some dependence and on the part of the colony the sense of obligation of protection and recognition, which was pleasing to the British. Pahang, however, being left alone, became notorious for cruel misgovernment, even among the other independent Malay states.

When in 1888 a Chinese British subject was murdered at Pekan, the capital of Pahang, the sultan was called on to make reparation for this murder. After some time and protracted negotiations, the sultan asked that a British resident might be appointed to assist him in the administration of his country on the same system as was then in force in the Pro-

tected Malay States. This request was complied with, and Mr. J. P. Rodger, a late visitor at Manila, was appointed the first resident in October, 1888.

The aboriginal tribes lead a wild and roving life in the jungle.

The Malay is not an ambitious workman. He has a proverb to the effect that "He who purchases money at the expense of his comfort buys very dearly." He indulges in some desultory cultivation of the soil, in the production of forest produce, fishing, and boating. In the two latter he is very expert. Being a sportsman by nature, he will work harder and with more relish with that object in view than for the sake of enriching himself. They are an indolent, contented, thriftless, unambitious, polite, and peaceful race, mainly the reverse of the sullen, revengeful, silent, and bloodthirsty Malay commonly portrayed in books of travel." Bad characters are probably not much more frequent among the Malays than other nations.

"In a work published fifty years ago, Selangor was described: 'Of all the Malayan states on the peninsula it labors under the heaviest mala fama on the score of piracy, man stealing, manslaughter, and similar peccadilloes of the code of Malayan morals.'

"Of the Malay population of the state at the present date there is little to say, except to emphasize the contrast noted by an eminent authority between the frank simplicity and humor, harmonizing well with a certain grave, dignified self-possession, and genuine politeness, which characterize the manner of the Malays of Kedah, and the sinister and impudent bearing of the maritime and semipiratical Malay of the south.

"There is now a large population of settlers from Sumatra and Java, who are influencing materially the character of the Mohammedan population."

The Chinese practically monopolize the whole of the tin-mining industry and are found engaged in every conceivable trade and business, and are the mainstay of the commerce of the country. They far outnumber any other race in the states.

Tamils from southern India are present in large numbers. The majority of them are outdoor laborers on estates, roads, and railroads.

Other races represented are Europeans, Bengalis, Singhalese, Javanese, Sikhs, Pathans, and the Malays from the various islands of the Eastern Archipelago. Up to 1896 each of the four states was independently administered on behalf of its native rulers by a British resident and the usual staff of government officers, acting under the direction of the governor of the Straits Settlements.

In the beginning there were no roads. These men tramped through the jungles, slept in the open, mixed with the people, held courts in all parts of the country, and brought order out of chaos, regulated mining camps, trade, agriculture, the building up of towns, and more than that, collected and spent with judgment the revenues derived from the wonderful resources of the country. They went so fast that the colonial office in London overruled them and gave instructions that these British residents were not men in authority, but were merely advisers to the native rulers. However, the British residents were on the spot, and although called advisers, continued to rule and to govern in spite of the instructions, and in the jungle and swamp they have built roads and railroads, assisted in the development of mines and the opening up of large agricultural estates, and in thirty years can show a country dotted with well-built towns and villages, and comparatively cheap excellent means of interior communication and with the outside world.

The administration of the estates is now settled in the following form:

"Subject to the direction of Her Majesty's principal secretary of state for the colonies, the governor of the Straits Settlements also holds office as high commissioner of the Federated Malay States. The principal civil officer resident in the states is the resident-general, in whom is vested the direction of affairs in all the states. He is assisted by a staff of federal officers, to whose hands is intrusted the supervision of the principal departments of the four states, such as those of finance, lands, mines, public works, railways, police, prisons, and education.

"The federal staff also includes the judicial commissioner, in whom is vested the supreme judicial authority, the legal adviser, the commandant of the regiment of the Malay States Guides, the protector of Chinese, the pathologist, and the superintendent of the government experimental gardens.

"Subject to the direction of the resident-general and the supervision of the federal officers, each state continues as heretofore to be administered by its own resident upon nearly the same lines as was formerly the case. The revenue of each state is separately collected and the expenditure is met therefrom so far as is possible. Where the revenue of any state is yet not sufficiently large to enable it to entirely defray the cost of its own development pecuniary assistance is rendered by those in more prosperous circumstances.

"The ranks of the civil service are recruited by the appointment of cadets after examinations in England, held annually about the month of August. These examinations are conducted by the civil-service commissioners, and are held conjointly with those for appointment in the home, Indian, and eastern colonial services.

"All cadets are required to pass an examination in Malay, Chinese, or Tamil and also an examination in law, after a prescribed period of residence in the state. Those who are

instructed to study Chinese or Tamil are sent for the purpose to China or to India, as the case may be.

"The selection of officers possessed of professional qualifications rests with the secretary of state for the colonies.

LEGISLATION.

"Laws are passed in each state by the state council, of which the ruler of the state is the president and the members are the British resident, the secretary to government, where such an appointment exists, the principal Malay rajahs, and one or more of the most influential Chinese traders. All legislative enactments are submitted to the high commissioner and the secretary of state.

POLICE.

"The police force is composed of Indians and Malays, and is officered by Englishmen.

REGIMENT OF GUIDES.

"The military force of the states consists of a battalion of Sikhs and Pathans, known as the Malay States Guides, to which is attached an artillery corps armed with field guns.

"Appointments in the guides are filled by officers generally selected for that purpose from Her Majesty's regiments. A knowledge of Hindustani is considered essential."

RECEIPTS AND EXPENSES.

	Receipts.		Expenses.	
	1895.	1901.	1895.	1901.
Perak	$4,033,611	$8,532,594	$3,757,007	$8,882,579
Selangor	3,805,211	6,544,796	3,083,386	6,060,780
Negri Sembilan	633,443	1,669,353	511,248	1,632,958
Pahang	106,743	794,764	231,913	696,841
Total	8,579,008	17,541,507	7,583,554	17,273,158

The import duties are upon opium and spirituous liquors only. The export duty on tin is on a sliding scale, 11 to 14 per cent ad valorem. On gold and other minerals, 10 per cent valorem. Upon other natural products, such as jungle produce and ivory, 10 per cent ad valorem. Upon cultivated products, such as coffee, pepper, copra, sugar, tapioca, rubber, the maximum duty is 2½ per cent ad valorem, usually less. No export duty is charged on coffee when the market price is less than $19 per picul.

IMPORTS AND EXPORTS.

	Imports.		Exports.	
	1895.	1901.	1895.	1901.
Perak	$9,581,372	$16,219,191	$15,596,225	$28,264,584
Selangor	10,759,123	17,845,835	13,955,803	24,520,625
Negri Sembilan	2,366,279	4,496,670	1,295,464	7,665,369
Pahang	946,497	962,906	775,313	2,656,599
Total	23,653,271	39,524,602	31,622,805	63,107,177

These are interesting as showing the increase in the states having good communications, although the railways have been but lately constructed.

The currency used is the Mexican or Straits Settlements dollars, which is the dollar referred to in this report.

TELEGRAPHS AND TELEPHONES.

There is a complete and efficient system of telegraphic communication maintained throughout the Federated Malay States, and between the straits and the colony of the Straits Settlements and other countries.

The telephonic system is being rapidly developed. There is telephonic communication with most of the police stations, different government institutions, sanitaria, and offices.

PORTS AND HARBORS.

The principal ports are Port Weld and Teluk Anson in Perak, Port Swettenham in Selangor, Port Dickson in Negri Sembilan, and Pekan in Pahang. With the exception of Pekan in Pahang they all have excellent wharf accommodations, and are connected by railways with the principal towns of the states in which they are situated.

SCHOOLS.

Vernacular schools are in almost every town and village, and English schools for boys and girls in Perak, Selangor, and Negri Sembilan. All schools are entirely maintained by the government or partially by grants in aid.

HOSPITALS.

There are over 14 hospitals, with wards for the reception of European patients attached, in the larger towns.

RAILROADS.

There are over 350 miles of railway built by the state, and a private line from Serembang to Port Dickson in Negri Sembilan. The Malay states have just formed an agreement with the sultan of Johor, which will permit the Malay states to extend their railroad through Johor to Singapore, which is now being surveyed and work is to commence at once. The state lines have been built out of the revenues of the country.

ROADS.

All the principal mining centers of the states of Perak, Selangor, and Negri Sembilan are connected by metaled cart roads. The road system is very efficient. The roads are well bridged, and very carefully upkept at considerable cost (from $250 to $1,200 per mile per year, depending on the traffic).

LAND.

The question of land, its ownership, titles, use, etc., in the Malay Peninsula was in so unsatisfactory a condition, owing to defective registration, want of proper landmarks, and other causes, that some years ago the then governor, Sir F. A. Weld, determined to introduce the Torrens system. With that end in view he sent Mr. W. E. Maxwell to Australia to study the system on the spot. Upon his return ordinances were passed and the system put into operation.

"For all purposes other than that of mining, state land is alienated by the issue of a grant in perpetuity, upon payment of premium or purchase money varying in amount according to the position and nature of the property alienated. An annual quitrent is also reserved in all cases, which rent may be periodically revised at intervals of thirty years.

"No state land situated within the limits of any town may be alienated except by sale by public auction.

"Country lands may be selected and applied for to the local land office, and, if available, will be alienated to the applicant upon payment of the prescribed fees.

* * * * * * *

"Mining lands are alienated either by auction or by selection. The title issued in respect of such properties is a mining lease, the terms of which shall not usually exceed twenty-one years, except in the case of special concessions necessitating a large outlay of capital.

"The continuance of the tenancy is in all cases dependent upon the regular compliance of the lessee with the conditions imposed by his lease, principal among which are those regarding continuous working and the employment of an adequate labor force.

LABOR.

"All manual labor is performed by Asiatics. The nationalities so employed are Malays, Chinese, Tamils, Javanese, and Bengalis.

"The Chinese will undertake almost any class of work, from the high-grade handiwork of the skilled artisans in wood and metal to the drudgery of the most menial offices. The labor force in the mines of the Federated Malay States is almost exclusively composed of Chinese, but they seldom work as agricultural laborers, except on their own account as vegetable gardeners, or for employers of their own nationality. When engaged on road and railroad work, the arrangement is usually made with the headman on behalf of his gang of coolies, and not with the men individually. Chinese labor is more satisfactorily utilized on piecework or contract than on daily wages. Except in the case of domestic servants, it is usually difficult to persuade them to work otherwise than on those terms.

"Tamils * * * are more amenable to European control than Chinese, and, therefore, form the bulk of the labor force employed by the government and by English planters and contractors. Their remuneration generally takes the form of daily wages paid monthly. They are the best coolies for road and estate work."

The Javanese, though not numerous in comparison with the above named, are fairly reliable laborers, when obtainable, as gardeners, for earth work, digging and clearing drains, etc. They receive daily wages at monthly intervals.

The labor is divided into two classes, indentured labor and free labor. The first class, "those who received from their employers the cost of their passage from India or China to the Federated States, and advances of money or clothing prior to or at the time of their arrival, in consideration of their entering into a contract to serve for a fixed period at certain rates of wages, during which period the advances so made are repaid to the employer.

"The rates of wages paid to indentured laborers are usually lower than those given to free laborers, but experience has proved that free labor nevertheless suits European employers better than employemnt by formal contract.

"The outlay in respect of each coolie imported may be estimated at about $20 a head, which is afterwards recovered from him.

"The following are approximately ruling rates of pay for coolie labor, in addition to house accommodations:

"Indentured coolies: Chinese, $4 to $5 per month; Tamils, 17 to 20 cents per day. Free coolies: Chinese, 30 to 40 cents per day; Tamils, 23 to 35 cents per day.

"Skilled native labor, e. g., carpenters, fitters, engine drivers, etc., command rates ranging from 50 cents to $2.50 per day.

"The wages of domestic servants are (per month): House boy (indoor servant), $10 to $15; cook, $10 to $15; water carrier, $7 to $10; syce or groom (one for each horse kept), $9 to $12; gardener, $8 to $10.

LIVE STOCK.

"Cattle are principally used for draft purposes, and are of three descriptions, buffaloes, Indian cattle, and native cattle.

"The cost of a pair of Indian bulls may be anything between $100 and $200. That of a pair of the smaller native cattle varies from $80 to $150.

* * * * * * *

"The cost of a good Indian cow is not less than $100.

"Horses and ponies are all imported, mostly from Australia.

"Australian horses for riding and driving cost from $250 to $600, the average price being about $350 to $400.

COST OF LIVING.

"The cost of living is somewhat high. Probably the smallest sum upon which a bachelor on an estate or in a country district could live with any approach to comfort, considering only the necessaries of life and making no allowances for luxuries, would be from $80 to $100 per month. If any margin is to be allowed for amusements and social diversions at least half again must be provided.

"These figures represent the lowest possible limit in the case of gentlemen of education and refinement."

MEANS OF TRANSPORTATION.

In addition to the railways there are light two wheeled pony carts, jinrikishas, and bullock carts.

ARTISANS.

"There is no opening for European skilled labor.

"The management of engines and machinery in mines and workshops is intrusted to skilled natives (Asiatics) under European supervision. Their work is satisfactory, and their remuneration much less than that which would be required by a European mechanic.

CLERKS.

"There are no openings for clerks. All this work is done by locally educated Eurasians and natives (Asiatics).

PLANTERS.

"To the young man possessed of moderate capital planting affords the best opening. The first two years should be spent in diligently acquiring local experience and a knowledge of native languages by working as assistant upon the estate of an experienced planter.

"He may then make himself acquainted with facts relating to different varieties of crops, such as the initial outlay per acre until the time when a return may be expected; the period which must elapse before the return comes in, the cost of subsequent upkeep of the estate, and of the preparation of the produce for the market."

MINING.

The same applies to men wishing to engage in mining.

SPORTS.

Cricket is very popular, and there are many match games. Foot ball is much played and is very popular among the natives, who may be seen playing it on the public lawns or plazas in every town. Lawn tennis is played everywhere. The courts are all grass. Hockey and golf are popular. There are golf links near the large towns. There are four race courses in the Federated Malay States and regular race meetings. Polo is played in Kuala Lumpur.

For shooting there is the following game: Elephants, bison, rhinoceros, tiger, deer, crocodile, wild pig, snipe, pigeons, besides many other beautiful birds, suitable for a musuem.

CLUBS.

There are clubs in all of the principal towns, situated near the cricket grounds, tennis courts, etc. In the cool of the evening they are patronized by ladies as well as by gentlemen. Billiards and bridge are the games. There are Filipino bands which play three times a week in two of the large cities.

At 4 p. m. on June 29 I sailed from Singapore on the *Selangor* for Port Swettenham. The *Selangor* is the newest boat of the Straits Steamship Company, and is a very excellent passenger and freight boat for their trade. It is clean, with electric lights and fans, tiled bathrooms and water-closets, little novel conveniences, etc. The captain is a Mauritian half-caste. One white engineer, the rest Malays and Chinamen.

Touched at Malacca 11 at night and at Port Dickson about 7 the next morning. Reached Port Swettenham at 11.30. Port Swettenham is the port for Kuala Lumpur and the state of Selangor. It occupies an island between the two branches of the delta of the Klang River. Ocean-going steamers can come up the river on either side of the island. The port is built in a swamp where thousands of coolies died before the swamp was well drained, as it is now, with very deep ditches and fillings and clearing away the jungle, at a cost of over $100,000. Now there are three large wharves on cement piles encased in iron tubing about 3 feet in diameter. The railroad comes down to the wharves, with branch lines and turntables so that the freight cars may run alongside the steamers. The three wharves can not now supply the demand for wharfage, and the construction of others is under consideration. There was an error made in placing the piers where they are. The railroad should run across the Klang River and should come down to a point opposite the present piers, so as to thus have avoided the building of a bridge and a slight obstruction offered by a bar some 300 yards below the present piers.

The trip by train to Kuala Lumpur occupies about an hour and a half, through jungles and swamps and plantations of nipa (set out and grown for profit), coffee, much para rubber, ficus elastica, tea, cocoanuts, sugar, and many fruit trees. The railroad is well ballasted, with deep ditches on either side, from 6 to 12 feet.

Kuala Lumpur is the capital of Selangor and is the chief town of the state as well as the largest in the Federated Malay States, and is the headquarters of the administration of the Federated Malay States as well as the state of Selangor. Practically the whole of the commercial industry of the state is centralized in Kuala Lumpur, as most of the firms which do business in other districts have located their principal offices in the capital.

The state of Selangor is divided into six districts:

First. Kuala Lumpur, which contains a considerable number of the more i · portant mining fields, and also of the agricultural estates opened by English planters. The mining center of Sungei Bosi is another important town of this district.

Second. Klang.

Third. Ulu Selangor, which is the principal center of the mining industry of the state. Its principal towns are Kuala Kubu, the headquarters of the local administration, Serendah, Rasa, and Rawang, which are all busy mining towns.

Fourth. Ulu Langat. Local headquarters are situated at the town of Kajang.

Fifth. Kuala Langat, which is a coast district. There is no mining here, the principal industries being agriculture and fishing. Headquarters are at Jugra, which is the home of his highness, Rajah Suleiman bin Almerhom Rajah Musa, sultan of Selangor. The state has built the sultan a large palace at Jurga. He has several houses there of his own and is quite wealthy, drives in a yellow coach with good Australian horses, well liveried coachmen and footmen; he lives in great state.

Kuala Selangor is an extensive district on the northern portion of the Selanger coast, lying between the district of Klang and the Bernam River. It is only partially opened up at present. Local industry is confined to agriculture and fishing. A European company has a cocoanut oil mill established near the mouth of the Selangor River, the headquarters of this district, which is doing much to promote the planting of cocoanuts.

From the town of Kuala Lumpur excellent roads radiate to all districts, supplemented in most cases by the railway, so that the facilities for commercial intercourse between the capital and all parts of the country are excellent. Selangor possesses 570 miles of roads and bridle paths, of which over 270 miles are first-class metaled roads.

The principal public buildings of the state are at Kuala Lumpur. The government offices are contained in an imposing building erected in Arabesque Renaissance, with a frontage of 480 feet, facing the public recreation grounds. The clock tower in the center is 130 feet high. Other important buildings are the official residence of the resident-general overlooking the beautiful public gardens; the prison, with accommodations for 1,000 prisoners on the block system; the railway stations and offices; and in process of building are new railway offices and the town hall, in keeping with the government office buildings. The government office buildings were erected at a cost of about $125,000. The town has waterworks, which now need to be increased.

In front of the office buildings is a large square of excellent turf, well kept, where foot-ball, croquet, hockey, tennis, etc., are played. Opposite the office buildings is the club-house; back of the club a hotel. Near the hotel is a rest house built by the government in order to keep the hotel up to the standard. The hotel, however, was only fair. I put up there and went to call on the British resident, Mr. Douglass Gordon Campbell, who invited me to stay at his house. The residency is situated on the top of a hill, and winding roads come up to it from two sides. The slopes of the hill are in grass and flowers. There are a couple of tennis courts and a croquet court. A little below the residency is the guard-house, where a detachment of Malay Guides is kept for form's sake, to add dignity to the resident. This guard is kept in full dress and turns out to do honor to high officials, a visiting sultan, or certain rajahs who are entitled to that honor. The same custom obtains at the residency in each state. The house is large, with 8 bedrooms, each with its bath. The houses of the important officials are scattered about on hills surrounding the town. The resident-general is at Carcosa, overlooking the public garden of nearly 200 acres, which is laid out with much taste about a pretty lake and maintained by the government at a cost of about $5,000 a year. The garden has a number of English flowers and shrubs, as also tropical and subtropical plants and flowers, and a handsome avenue of royal palms leading up to the lake club, with its tennis and croquet courts, where the members and their families gather each evening.

It is the custom in the Malay states and in other English colonies to dine at 8 o'clock. Almost all the men and many ladies take some sort of exercise in the afternoon, then dress for dinner, and retire soon after dinner. On occasions there are gatherings in the evenings. All rise at an early hour. The officials having outside work generally employ the time before breakfast in inspection of roads, buildings, etc. Taking early coffee and 5-o'clock tea is the general custom.

As the officials of the government and the members of the commercial concerns spend most of their lives in the Tropics, everything is done by the government or by directors of the large concerns to add to the comfort of officials and employees. In out of the way places the government builds or contributes to the building of clubhouses, likewise do the managers of the large concerns, and frequently either the government or the companies furnish billiard tables, bowling alleys, pay for the construction of tennis courts, etc. This is done in the spirit of economy, as the officials and employees are thus made contented with their surroundings and keep in good health.

The officials were very courteous to me in explaining their land laws and systems of administration. Land can be obtained in several different ways. A land grant in perpetual lease can be obtained at an annual rental depending on the value of the land and the intentions of the lessor. When a company is formed with large capital, many concessions are made, and the land is held, provided the conditions are fulfilled. It frequently happens that companies which take out large tracts of land and improve them agriculturally will then sell the same to another concern. The large coffee plantations throughout the Malay states have suffered very much from blight, and are now being abandoned in favor of rubber and cocoanuts. Natives to obtain lands make their application to the headman of the town or barrio, who enters the application in a book and states that no one else occupies this land. A rapid survey is made of the land, which is then passed on by a settlement officer. A certificate of title is then furnished, on which is written the conditions, which are to the effect that it shall be cultivated to a certain extent and a fixed annual rent shall be paid. Any land held under this system, under 100 acres in area and extent, which has been abandoned for three consecutive years, shall be liable to forfeiture, notwithstanding that rent may have been paid during the whole or any part of such period.

The alienation of government land may be made by auction or otherwise as the resident may from time to time generally or in particular cases direct. In every such grant there is reserved the right to reenter the land in any one of the following events: (*a*) If the bona fide owners be not made to cultivate the land within twelve months from the date of the grant; (*b*) if the said land be not cultivated to the extent of one-quarter of the total

area within five years from the date of grant. The whole object of the land laws and the administration of the same is to increase the agricultural industries in every way, and at the same time to reserve to the state the right to retake possession of the land, provided the owner or lessor fails to cultivate the same. The lessor may, however, at any time, borrow money on his land as security. He may transfer the grant or lease. The surveying is much behind time, and to a great extent the taking up of lands is retarded on that account. The surveyors are principally Australians, who are considered by the officers in charge of public surveying as being most expert and satisfactory at this work. The surveys in case of land grants are very accurate. Those in case of leases to natives are approximately so.

In cases of leases of mining lands the same general rules apply. The mining lands are leased, generally at a rental of 1 or 2 pesos per acre per year. The lessor may, with the permission of the government, sublease portions or all of his grant. A certain amount of work is required to be performed, which is about that of 4 coolies per acre. In addition to the land rents the government receives an export duty of 10 per cent on the value of the ore or metal extracted. It is paid on a sliding scale, and the estimate of the value of the ore is generally less than that of its actual market value. The great wealth of the Malay states is due to this export duty on tin ore.

There are enactments regulating the employment of Chinese agricultural laborers and Chinese laborers in mines, a law relating to employers and laborers, and special laws relating to the lease of mining lands. The point that interested me was the actual administration of these laws by the officers of the government and the thorough inspections made by them.

The system of records of the secretary is very good, and it is the same system that is pursued in all British colonies. All the communications relating to one case or paper are put in a cover called a "minute paper," which receives a serial number, a brief of the subject, and the name of the writer of the first communication. The clerks write on the outside of the cover the numbers of all previous papers relating to the subject, which are brought in to the official who acts on the papers. The remarks of each official are written on the minute paper and signed with his initials, so that a complete memorandum history is kept of each action taken. As a matter of interest, samples of the printed form are attached. The indexing and filing are not modern, and still consist of filing papers away by years and indexing them in books, an index book for each year. The officials were all much interested in descriptions of the card-index system, but strange to relate I could find in no magazine issued from London any advertisement relating to the card-index system or the vertical-filing system now so prevalent in the United States.

His excellency the high commissioner and governor of Singapore was about to start on his first tour through the Malay states, and preparations were being made to receive him.

I left Kuala Lumpur and went by rail to Kuala Kubu with Mr. Wray, who was returning to the state of which he is the British resident, Pahang, to make preparations to receive the governor.

From Kaula Kubu there is an automobile service over a mountain divide, elevation of 2,700 feet, to Raub, a distance of 40 miles, which we made in three hours and ten minutes, including stops. At the summit of the divide there is a rest house with some ten rooms. These rest houses are built all over the country, especially near each settlement. They are built by the government at a cost of from $1,200 to $8,000 or $10,000. The officials do not pay for their lodging, but do pay for their meals. The government pays the care taker in charge of the rest house, the cook, and one or two attendants. The prices they are permitted to charge for meals are such as to enable them to make a fair profit. There is a remark book kept in each rest house, and each official states, under the date of his visit, the condition in which he finds the rest house and service. There is a column for complaints. The result of it is that, as a rule, they are comfortably run. The care takers are generally natives of India or Chinamen.

At each police station there are kept capsules of quinine for sale at 1 centavo per capsule.

The road from Kuala Kubu to Raub goes on to Kuala Lupis, one of the capitals of the state of Pahang. It is about 80 miles in length and cost $1,250,000. It has an easy grade and metalled roadbed about 12 feet wide, and is kept in excellent condition.

As Pahang has been but lately taken over by the British officials, it is not fully developed, but money is loaned by the other states for its development. Another road is being pushed into Pahang, and the line for a railroad is now being surveyed. Pahang has an area of some 14,000 square miles, its line of greatest length approaching 200 miles of the east coast of the peninsula, and includes two chains of islands running parallel to its coast. There is yet a large amount of uninhabitable jungle which has not been penetrated. It has not been thoroughly prospected for minerals, although alluvial and underground tin mines are worked and are paying, and gold mines are also being worked.

Pahang had in 1902 a population of over 84,000, of which over 73,000 were Malays and other natives of the archipelago, including the wild Sakai and Semang tribes. The former are short and rather lighter in color than the Malays. The blowpipe, with its pointed darts, and bamboo spears constitute their weapons. They decorate these, and the simple utensils

that suffice for their wants, even the bamboo in which they cook rice, and are used only once, are sometimes elaborately decorated with fancy patterns. Nearly every tribe has a dialect of its own. The Semangs are smaller than the Sakai, rather darker and more negroid in appearance, with close curly black hair. They use bows and arrows, in addition to the blowpipe. They lead a purely nomadic life in the jungles, living on what they can kill with their weapons and on wild fruits, leaves, and roots. The Sakai wear no clothes, a strip of bark being all that they consider necessary.

Mr. Wray believes in a great future for Pahang. At present it is heavily in debt. In 1901 this debt amounted to over $3,500,000, which has been increased since. All the money required by Pahang for the expenses of administration is advanced by the other states, principally that of Selangor.

The increase in trade in this state shown in the following table is striking:

Year.	Imports.	Exports.
1892	$541,673	$331,196
1895	946,497	775,313
1900	973,405	2,322,050

The government now pays for an automobile mail service, the automobile in addition carrying freight and passengers. The automobile company is French, and has about 20 machines at Raub. They carry a great many passengers and are now getting in a number of large freight trucks, as well as large vans for second and third class passengers.

At Raub are gold mines, which are reported to be rich. The Raub Mining Company has an excellent electric plant, including three 50-horsepower dynamos. The power is taken from some waterfalls 7 miles distant. An instance of the interest taken by the government in the development of gold mining: It is now paying one-half of the expense of sinking a new shaft for the Raub company.

The town of Raub has two or three streets of brick houses, after the Chinese fashion, and built by Chinese, stores below and dwelling apartments above. The Malays, as usual, live on the outskirts in their bamboo houses. There is a good police station and a good rest house. The district and forestry officers have comfortable bungalows. There is a hospital, small but well kept, surrounded as usual by lawns. En route on the road we passed several small villages, all in neat order. The old wooden bridges are now being replaced by stone and iron ones as a measure of economy. The road, which has been satisfactory for bull carts, is now being widened to accommodate the greater traffic and the motor cars. The bull carts generally travel from 5 to 20 together at night.

On returning to Kuala Kubu, the district officer, Mr. Bowen, was so cordial in his offer of hospitality that I remained there with him one night. He was very courteous in showing me the administration of his town. All towns in the Malay states are managed by sanitary boards, which are practically governed by the district officer, under the resident of the state and the resident-general. They are appointed by the resident.

Kuala Kubu, although a small place, has a good market, with cement floor and tile roof. There is a quite good hospital there, with four wards. Mr. Bowen introduced me to the land surveyor and to Mr. McClelland, who has an expert knowledge of Malay. They showed me the details of the land system, and gave me several drawings and forms. In the afternoon I went to Rosa, a few miles below Kuala Kubu, to look at some alluvial tin mining where the overburden of sand and peat is not over 30 feet. This is generally removed by Chinese coolies in baskets. The ore is then taken to the simplest kind of a trough and washed. When the overburden is more than 30 feet shafts are sunk, but when worked by the Chinese these are badly ventilated and of temporary construction.

Nine miles from Kuala Kubu, on the mountain, in sight of the district officer's house, at an elevation of 3,200 feet, there is a sanitarium built by the government. A bridle path leads up to it. It is a resort for officers and their families. Like sanitaria are scattered about the state, there being four or five of them. There they grow good vegetables, strawberries, and fruit. The ladies go up on horseback or are carried in chairs. The sanitaria are run in the same manner as are rest homes. The advantages of such resorts at hand and at relatively small cost are evident.

Mr. Bowen showed me the native school, which was built some 6 feet above the ground, with long extending eaves and open sides, with the exception of a paneling about 4 feet from the floor. The schoolhouse was situated in a garden of flowers. The advantages of the building are simplicity, cheapness, perfect ventilation, and good light.

The hospital has several good wards, and a poor operating room, which is being repaired. The wooden floors of this hospital are being torn up and cement ones substituted. The large ground were in good order.

From Kuala Kubu I went to Batu Gajah.

En route I met a Mr. Kessler, a Frenchman, who is the manager of a French company which has a concession for operating automobiles and is also engaged in mining. He spoke of the difference between Cochin China and the Malay states and how much better a French company could do in the Malay Peninsula than in Cochin China, and he thought that a French company did better work than an English company in the Malay states; that the Englishmen have a small number of officials for the management and employ Asiatics for everything else, while he brings out a comparatively large number of Frenchmen as overseers and foremen and even as artisans, and that he pays them comparatively small wages: that, whereas the Englishman must have his sport and exercise, the French managers and overseers give all their time to business. He states that business and agriculture are much more encouraged in the Malay states than in Cochin China; that in the latter place there are too many officials who are located in the cities and there is too much officialdom, which interferes with business.

Batu Gajah is the headquarters of the Kinta, the richest of all the districts in Perak or any of the Federated Malay States, due to the very productive tin mines. I visited the richest of these, called the Tronoh mine, which is owned by a small company, of which a Mr. Edgar is the directing manager and a Chinaman is the principal shareholder. Its stock is capitalized at £160,000. The mine is now being well worked under new management. It consists of an alluvial bed about 200 feet wide by 200 feet deep, or deeper, the top dressing from 5 to 30 feet of sand or peat. The ore is very rich. It is now much scattered. Some twenty-five small engines and boilers are located in different parts of the grounds and three shafts are running, besides the open workings. They have eight puddling tanks and are putting in more.

Several villages, with brick houses and clean streets, are passed on the road, which is excellent.

The mine is expected to pay this year about 40 per cent on its capital.

In Batu Gajah is a large, beautifully situated hospital. All residences are on a ridge, which is about 150 feet above the town. The hospital grounds are well arranged. There are nine large wards, with cement floors, tiled roofs, well-ventilated ceilings, walls of bamboo matting in frames, so arranged that they can be turned to give free circulation of air. The women's ward was separated by a fence. Malarial patients were screened off.

Near by was the jail. It also is well arranged. It is, however, only for short-term prisoners. It is square, about 100 yards, surrounded by a high brick wall topped with broken glass. It has 2 old associate cells and one three-story block with 160 separate cells. There were 227 prisoners, mostly Chinese, no European. There are two general working rooms for prisoners, and a long shed with stalls is being built in which prisoners can break stone. The guards and attendants are Pathans, with an English warden, who has a good house near by. In a long row of working stalls the prisoners make rattan baskets and curtains, cocoanut-husk mats, etc.

On the same ridge is a handsome club, with tennis courts, a golf course, and farther on a good race course.

Ipoh, near Batu Gajah, is the principal mining town of the states. It is well laid off and drained and exceedingly well kept. The streets are good, the houses well built.

The American mission has a large school here, which is doing well. It is here that the International Tin Company, an American concern, built its headquarters, offices, and storehouses. This company was formed in New York to handle ore from all over the world, and especially to reduce refractory and low-grade tin ores. Its manager came to the Malay Peninsula and understood that there would be no objection to the establishing of storerooms and an agency for the purchase of tin ore in the Malay Peninsula for shipment out of the country. They then constructed in New Jersey, opposite New York City, a modern smelter, put up their houses, established their agencies in various parts of the world, including the Malay Peninsula, and went to work purchasing ore and shipping it to New York. Then the Straits Smelting Company, the only tin smelter in the Malay Peninsula, put in a protest to the government and stated that the Americans were endeavoring to control the price of tin; that they would get hold of all the ore, take it into the United States at a small duty, manufacture it into tin, sell their tin in the United States, the principal consumer in the world, and thus ruin the almost control that now obtains in the Malay Peninsula. At present the price of tin is determined by the London market. The representative of the International Tin Company maintained that the miners and the government in the Malay Peninsula would profit by their business, because they would buy low-grade ores that were not now worked; that at present the Straits Smelting Company had a practical monopoly, and that by competition the miners would get more for their tin, hence the government would receive greater revenue. The government, however, took alarm and put a prohibitive export duty on tin ore of $30 a picul. The International Tin Company have therefore closed up business and have given up the idea. The government invited them to come to the Malay states and establish a smelter, which they have so far declined to do.

One of the mines near by has been paying about $8,000 per day. It is owned by a Chinaman, who has an English manager. They have a fine electric plant. It is said that the rich ore is contained in a pocket, which is not extensive. The Chinaman and an Englishman were partners in a coffee plantation on the ground. The Englishman, seeing that coffee-growing was becoming a losing business, sold out his half ownership to the Chinaman for $5,000. In a short time the Chinaman was getting large returns from the tin ore from the coffee plantation. His ex-partner is now state warden of the mines.

At Ipoh a number of elephants are to be seen, which carry supplies to the mines in the mountains and swamps where there are no roads. The elephant is said to be the best pack animal for the jungle and swamp. At the time of the governor's visit, a few days after I left, 50 elephants were formed in two lines to receive him, between which he passed in an automobile.

Kuala Kangsa is the headquarters of the district of that name and also the home of the sultan of Perak. The district officer's house is situated on a high bank, commanding a fine vista of the Perak River, which makes a large curve just here. The lawn, sloping down to the river, contains about 30 acres, with flowers and ornamental trees. Back of the house are large government orchards. House boats are used on the river, which is thus a very important means of communication. The resident of Perak has a residence in Kuala Kangsa, where he comes to consult the sultan. Here the Malays grow numerous fruit trees. The sale of the fruit brings in quite a revenue.

A so-called art school, which is really an industrial school, has been started at this place, and the district officer, Mr. Edmonds, took me to inspect it. It is for the purpose of preserving and encouraging native industries. There a native cabinetmaker, carpenter, tinner, jewelers, and wood carvers, and women teachers who instruct in the making of cloths, spinning, making of pottery, and embroidery work in silver and gold. The scholars here are paid $5 per month, the teachers $25 to $30, and the teachers have very neat houses, of which there are about six near the school. The officials have some doubt as to the success of this undertaking, especially the policy of paying the pupils.

In a drive toward the bridge over the Perak River I noticed that a number of Malays are putting up large brick dwelling houses.

Mr. Edmonds invited me to tiffin and dinner and to stop with him, but having sent my things on to Taiping I could not accept. He then invited me to return on the following Sunday for a picnic which he and Rajah Harum were giving as a sort of rehearsal of the one for the governor two weeks later. This invitation I accepted with greatest pleasure and considered myself very fortunate. We started about 9 o'clock Sunday morning, and after a drive out some 4 miles took elephants and rode on them through the jungle up into the mountains to where there is a granite bed, more or less smooth, of a small stream, with about an inch of water over the sloping granite for about 100 feet. There we put on bathing suits and slid on a piece of bark to a small pool of water below. A large crowd of Malays and a few Englishmen in good humor and fun made three hours pass in this way very enjoyably. The comical side to it might be easily imagined. The misfortunes of those who lost their balance in making the slide were a constant source of amusement. We then had a Malay tiffin of curry, eaten with the fingers, which was much enjoyed. There was also chicken cooked in various ways, dried fish, cucumbers, sweets made of cocoanuts, etc. After an hour's smoke we rode back on the elephants. Elephant traveling is unique, but not rapid nor very comfortable.

Taiping is the capital of Perak, and is a well-built city. Its government buildings are large and handsome, with oriental galleries and arches. The resident was away. The secretary was very cordial.

I was put up here by Capt. E. I. M. Barrett, adjutant of the Malay States Guides. The colonel was away to meet the governor.

It was quite dry in Taiping, no rain having fallen for some weeks, which was unusual.

Much interest is here taken by the officials in agriculture and other industries, also in the forests.

In the Malay states one meets many officials who have killed large game. There is a good museum at Taiping. Curator and State Geologist Mr. L. B. Wray takes much interest in the native industries.

In the museum are the skins of many trophies of the chase—tigers, panthers, tapirs, rhinoceros—and a handsome collection of birds, besides the reptiles, beetles, etc., a collection of native jewelry, brass and silver work, and of arms and various implements and utensils. There were also the skulls of two elephants that had been killed by trains on the railroad. The trains are not run at night for fear of running into wild animals.

The jail at Taiping is large and well managed. It is arranged on the block system, a number of three-story buildings with separate cells, the whole surrounded by a high wall. The cells all have cement floors. They are too large and not well arranged. Prisoners can look out of the windows. They can also manage to hang themselves. They are kept

at work at stone breaking, bamboo cane and chair work, making mats of cocoanut husks, book binding, carpentering, tailoring, and turning with native lathes made by a prisoner.

There is a hospital at Taiping which has about six large wards. It is surrounded by a neat lawn, with many handsome tropical ornamental trees. An ornamental iron picket fence surrounded the grounds. The floors are all cement, and the roofs of tile. Many of the walls are of bamboo. There is a large ward for lunatics. There are also two separate wards, somewhat isolated, one for male and one for female lepers. The lepers are collected here and then sent to an island in the Straits of Sumatra, kept up by the Straits Settlements and the Federated Malay States. There are in addition two wards for decrepits, which are kept up by liberal contributions from Chinamen. Here there were a number of blind Chinamen, and these obtain a little pocket money by the sale of baskets which they make. There are other decrepits of all sorts. It frequently happens that they are returned to China, their expenses paid by their friends.

The good clubs, facing the well-turfed square, with its football, hockey, tennis, and croquet grounds, and golf links, are near by.

The schools are large. New buildings are to be constructed soon. The schools are of seven grades, with native, Chinese, and English teachers. The children are Malays, Klings, Chinese, Tamils, and Eurasians. They are being instructed in English, but the superintendent seemed to think that more was accomplished for the Malays by the vernacular schools.

The officials here have nice houses and grounds. There is a good deal of rivalry in having good lawns.

Much interest is taken here in the forestry department. Mr. Bernard was in charge. They are endeavoring to preserve the gutta-percha by replanting. The protection of the wild gutta-percha is almost a failure.

There is a new scheme to collect forestry revenues. On each road near the city, over which jungle produce will have to come, they have built a little house for a native employee, who inspects all carts of jungle produce coming through. There it is measured and recorded. The payments are made to the proper parties.

There are twelve kinds of rattan that come out of the jungles, and many woods. For firewood the forests have been drawn upon and payment of revenues avoided. On the coast the mangrove is used for firewood. The government has surveyed the mangrove swamps and divided them up into twenty sections, permitting the cutting of the mangrove wood on one section per year, with the idea that at the end of twenty years the first section will have grown sufficiently to be recut. The government has planted much Para rubber and *Ficus elastica*, and also made experiments with teak.

The forestry rangers are uniformed with khaki, with trimmings and green felt or canvas puttees.

I returned to Kuala Lumpur on July 12, at the invitation of Mr. Campbell, to be present at a ball to be given the next evening to the governor by the resident general, Sir William Treacher. Captain Moore, of H. M. S. *Sirius*, and Colonel Walker, commander of the Malay States Guides, were also guests at his house. Colonel Walker is inspector of jails, and drove me over to see the prisons at Kuala Lumpur, which are excellent, on the block system, with separate wards for the female prisoners, as is the case at Taiping. In each jail in the Federated Malay States there is a hospital, frequently with screen walls as a precaution against mosquitoes.

I called on Mr. Wilkinson, the superintendent of education for the Federated Malay States. He is a very able and well-informed man, and has published one of the best dictionaries on the Malay language. He believes that more good is accomplished by the vernacular schools than in English schools for the higher education, although he has English taught all pupils. The teachers are generally Chinamen or natives of India, with a maximum pay of $30 a month, with a few English teachers getting $75 and more. The girls do not attend school as much as is desired, as the mothers prevent it. He is endeavoring hard to have the girls go to school, in order that in the future good results may come from it when they themselves are mothers. He is at work on a school for artisans and an advanced school for natives. He was much interested in the work done in the schools of the Philippine Islands, and is in communication with our general superintendent of schools. The government of the British Malaya is studying particularly the romanizing of the Malay writing, and the committee appointed to submit recommendations on the subject is in consultation with a like one in Java.

I called on the conservator of forests, Mr. Burn-Murdock. The Indian forestry laws are the models, with certain changes that are adapted to the needs of the Malay states. He thinks that the forestry fees are too small. They are 10 per cent of the value of the wood, estimated at $30 a ton for the first group, $20 for the second, and $10 for the third. He says gutta-percha is being stolen in the forests, but is being replanted as far as practicable. Other trees are being replanted. He proposed the use of elephants for the Philippines in forestry work.

The entertainment given the governor by the resident-general was a handsome affair, although the outdoor decorations were spoiled by the rain. His Excellency Sir John Anderson was very cordial. The sultan of Selangor attended, driving up in his yellow coach. He wore a uniform of blue, with gold and jeweled buttons, with shoulder straps and many diamonds and ornaments on his collar. He wore a silver-cloth head handkerchief.

I called on Mr. Kennedy, the state engineer, the next day, He states that the roads in the Malay Peninsula, through easy country, with metalling nearby, cost $10,000 a mile. In hilly and difficult country that is doubled. A metalled bridle path costs $5,000 a mile; the railroad $15,000 to $75,000 a mile. The new court-house that they are building in Kuala Lumpur costs $90,000; the government buildings at Kuala Lumpur cost $125,000. He laid it down as a principle that roads through paddy lands should be 2 feet above the possible level of the water in the ditches. That Bermuda grass or ice grass should be grown on the sides of the roads to protect them. They employ one man constantly for every 3 miles on a dirt road; on metalled roads they work men in gangs. The cost of building residences for fourth-class officials is about $2,000; for higher officials, up to $8,000 and $10,000.

I went by rail to Serambang, the capital of Negri Sembilan. Mr. Weld, the president, met me at the station, and took me to his house. There is a good club here. With the exception of the resident's office, the public offices in this town are old and are of wood. New ones are to be built. The resident's house is well situated, and there are many good roads about.

The hospital is very good, though old. Below is a statement of the cost of this hospital for 1903, which shows a daily average of 402.7 patients. This must include the out patients, and those who come from day to day. The equipment is good. They have screens in a number of the wards, of which there are about nine.

Statement showing cost of maintenance and salaries.

State surgeon	$3,682.72
District surgeon	4,319.09
Assistant surgeon	3,212.68
Nurse	1,200.00
Dressers	8,237.43
Clerk	840.00
Steward and storekeeper	720.00
Peons	960.00
Watchmen	288.00
Exchange compensation	2,603.02
Horse allowance	758.33
Bicycle allowance	390.00
Transport	3,096.40
Contingent	230.11
Medicine and instruments	6,417.08
Diets	36,011.63
Clothing and bedding	4,135.27
Hospital furniture	2,209.02
Lighting	821.54
Burials	945.00
Attendant and cooking	7,377.19
Upkeep of grounds	1,374.25
Maintenance and transport of lunatics	1,202.62
Miscellaneous services	108.80
Quinine for public sale	96.00
Rice allowance	540.00
Uniform for nurse	540.00
	92,613.53
Daily average number of patients in hospital during 1903	402.07

$92,613.53 divided by 366 makes $253.04, total cost per diem.
$253.04 divided by 402.07 gives $0.629, the cost per head per day including cost of administration.

The jail was good and new, the block system, for 140 prisoners, but they had more than the separate cells could accommodate. The jail cost at least $110,000. The prisoners do stone breaking for the roads, rattan work, cocoanut husk mats, etc.

Attention is invited to the following statements of the cost of opening and operating cocoanut and Para rubber plantations for a number of years, and the estimated receipts, as taken from the "Handbook" of the Federated Malay States:

Estimate for opening up and planting 500 acres of cocoanuts in Selangor (coast district).

First year:	
Survey $500, quit rent $250, premium $500	$1,250
Felling and clearing	4,000
Lining and holing	750
Cost of seed	2,000
Planting and fencing	2,000
Weeding	3,000
Roads and drains	5,000
Bungalow	600
Coolie lines and tools	350
Superintendence	3,000
Doctor $100, medicine and stationery, $100	200
Contingencies	150
Second year's expenditure	7,500
Third year's expenditure	6,000
Fourth year's expenditure	5,000
Fifth year's expenditure	7,000
Sixth year's expenditure	8,000
Seventh year's expenditure	6,500
Eighth year's expenditure	7,000
Total	69,300
In the sixth year a return of 20 nuts (at 2 cents) per tree may be looked for; seventh year, 30 nuts (at 2 cents) per tree; eighth year, 50 nuts (at 2 cents) per tree; total crop returns	64,000
	5,300

In some coast districts the natives count on a return during the fifth year from planting, but it is not generally considered safe to estimate anything until the sixth year.

Estimate to open 500 acres with Para rubber, doing 250 acres per annum.

Felling and clearing 250 acres at $10 per acre			$2,500
Lining 250 acres at $2 per acre			500
Holing and filling 250 acres at $5 per acre			1,250
Nurseries			400
Seed for same, planting 14 by 14 inches, 222 per acre, say 250 per acre, 187,500 seeds at 1 cent each			1,875
Planting and shading at $3 per acre			750
Roads and drains, 250 acres at $10 per acre			2,500
Weeding 250 acres for six months at $1 per acre per month			1,500
Supervision at $300 per month			3,600
Buildings:			
House for superintendent		$1,000	
House for assistant		500	
House for overseer		100	
			1,600
Coolie lines			500
Tools			500
Contingencies, hospital, etc			1,025
			18,500
Second year:			
Opening 250 acres, as above	$18,500		
Less buildings	$1,500		
Coolie lines	500		
	2,000		
		16,500	
Upkeep on first 250 acres at $30		7,500	
			24,000
Third year, upkeep on 500 acres at $30 per acre			15,000
Fourth year, upkeep on 500 acres at $30 per acre			15,000
Fifth year, upkeep on 500 acres at $30 per acre			15,000
Total cost to fifth year			87,500

Estimate of returns from Para rubber.

A good return of at least one-half pound per tree could be gotten from 5-year-old trees, but do not calculate on anything until the sixth year, when rubber planted on good alluvial land will yield at least 1 pound per tree. Planting 14 by 14 inches, there should be 222 trees per acre, but calculate only on 200 trees per acre.

Sixth year: 250 acres or 50,000 at 1 pound per tree—50,000 pounds at $0.75 per pound		$37,500
Seventh year:		
250 acres at 1 pound per tree	$37,500	
250 acres at 2 pounds per tree	75,000	
		112,500
Eighth year: 500 acres at 2 pounds per tree		150,000
		300,000

I have gone into details of this trip, to show the extreme kindness and courtesy extended to an American official by our British cousins. Their cordial hospitality was much appreciated by me, and I am sure will be so by the officials of this Government.

These states are of particular interest to me for the following reason: In 1899, en route to the Philippines for the first time, I passed through London and went to the colonial office there, and among other things asked the officials if they had any colony where the people were similar to those of these islands. They then told me of the Malay States and gave me a number of blue books, reports, etc., from those states. These were of much use in the associations I had with the Filipinos during my first tour in Luzon.

The interesting feature of the governments of all these colonies is that they are paternal to a degree and look well after the people. The officers are paid comparatively small salaries, are not allowed to engage in business of any kind, or to own any land in the colony. The secretary of Perak has passed his examination for a barrister, and has the reputation of being one of the best magistrates in the Federated Malay States; however, he is not permitted to serve as magistrate because his brother is the principal attorney in the state where he is stationed, therefore he is performing administrative duties.

(NOTE.—Mr. Maxwell, although he has passed his examination as a barrister in London, has not yet obtained his degree because he has not yet eaten the required number of dinners at the inns, nor can he get a dispensation, but must wait for his degree until he can return to London and eat the number of dinners the law requires. While this strikes one of our people as being absurd, the Englishman thinks that it is quite right that a barrister should be a man of good standing, socially fit, and that they are tested at dinner.)

In all these countries, while the officials are not, as a rule, above the average in many ways, still the fact that they are trained as government officials, have passed examinations in law, in government, and special examinations if assigned to any of the technical departments, and as they are committed to the government for all of their active life (except in cases of those under contract for a few years), the results obtained are very gratifying. They maintain the supremacy of the white race, and do not permit white vagrants in the colonies. The work of the government is entirely for the advancement of the colony, the preservation of order, the building up of trade, and the development of the country. The natives are advanced wherever it is practicable, and they are given as much power as it is possible to give them. The native sultans and chiefs are shown great respect, the customs of the people are carefully considered, and nothing is done by the officials to hurt their amour propre. Many of the officials become experts in the native language, and thus they understand, in a large measure, the working of the native mind. They have realized the fact that the native has his limitations, that there are certain things that he can do well, and other things have to be done for him. The clerks are natives. The highest paid is 100 pesos a month.

Some of the brightest school children are turned out with a good knowledge of English and easily get positions in commercial concerns at higher wages than are paid by the government. The laborers employed by the government are not paid higher wages than can be paid by residents of the country and by commercial concerns.

The railroads are clean and well run. The streets and roads are kept in excellent condition. In each one of the colonies visited agriculture, manufactures, and trade are steadily increasing. Each subsidizes boats for the convenience of trade, with the object of having good accommodation and furnishing regular, fixed, reasonable tariffs for the transportation of the products of the country and the imports.

The younger officials are frequently over zealous, but their mistakes are corrected by those who are older and have more experience. Of course, as in other countries, there

are many personal jealousies, etc., but the fact that they are all working through a fixed policy to the maintenance of order and to the advancement of agricultural and industrial interests and trade is due the magnificent results that have obtained.

It would be hard to find three countries more different than Sarawak, Java, and the Federated Malay States, yet any observer will derive great pleasure in visiting them.

The time spent in the various colonies was limited to twelve days in Sarawak, three weeks in Java, and two weeks in the Federated Malay States. The rest of the time was necessarily occupied in traveling by sea or waiting for steamers.

One reaches the very pleasing conclusion that the Philippines are by nature the most beautiful and productive islands in the eastern tropical seas, and that its natives are better advanced and as a rule more intelligent and more susceptible of improvement than those of the countries visited.

Respectfully submitted.

GEORGE T. LANGHORNE,
Captain, Eleventh Cavalry, Aid-de-camp, Secretary.

Maj. Gen. LEONARD WOOD,
Governor of the Moro Province, Zamboanga, Mindanao, P. I.

GOVERNMENT OF THE MORO PROVINCE,
OFFICE OF THE SECRETARY,
Zamboanga, P. I., September 8, 1904.

SIR: I have the honor to inclose herewith a few notes on the military and police of Sarawak, Java, and the Federated Malay States made during a recent visit to those countries while on duty with the civil government of the Moro Province.

Attached is a copy of a report made to the provincial governor concerning the governments of those countries.

Very respectfully,

GEORGE T. LANGHORNE,
Captain Eleventh Cavalry, Aid-de-camp.

THE MILITARY SECRETARY, UNITED STATES ARMY,
Washington, D. C.

(Through military channels.)

SARAWAK.

The police of Sarawak is composed of Malays, Dyaks, and Sikhs, a very small number of each. They are used in preserving order in the towns and in the outstations, and in carrying messages. Their uniform is rather neat and pleasing, of a sort of blue flannel, with a red sash and red turban or cap. Their cost to the government in 1903 was $76,974.

The uniformed military forces of the state are the Sarawak Rangers, a body of from 400 to 500 men, also made up of Dyaks, Malays, and Sikhs. Just at present, owing to the prosperity of the country, there is difficulty in getting Malays and Diaks to enlist, the pay being relatively small, from 6 to 18 pesos, with three to five year enlistments. They have two uniforms, one of white for daily use, with black braiding across the chest. The Sikhs wear turbans, the Malays and Dyaks small black caps, with the letters S. R. in monogram. The members of the band wear red caps. For night wear their uniforms are blue with red trimmings.

At the invitation of Sir Percy Cunnynghame I attended a drill and inspection of the command.

The rangers are quartered on the opposite side of the river from Kuching in comfortable barracks. The married men live in a large, long building, two rooms deep, opening outward on the two long sides, along which run broad verandas. Each married man has one room. In this arrangement the marriage certificate is not necessary.

There were 250 men in ranks. The Dyaks wore no shoes. The rangers are armed with Snider rifles and sword bayonets. The drill was in close order—the old British drill, a battalion of five companies or platoons, commanded by native sergeants. There was only one white officer besides the commandant. The drill was fairly good. The silent bayonet drill and the musical physical-exercise drill were very well done indeed. The physical drill is the same as that used by our troops, which was taken by us from our Navy, and by them from the British navy. The marching was poor. There was one very good movement which I do not remember noticing before—marching in close column and wheeling left or right into line successively from the rear.

Their equipment consists of black leather belts and small pouches. For the field they use for ammunition a white-painted canvas pouch with a shoulder strap, and for a haversack a simple cotton bag.

There is a very picturesque old fort on top of the hill, built for a place of refuge in case of a serious uprising, which, like all the grounds and buildings, is kept particularly neat. The fort was an interesting relic. The guns were old, the latest bearing date of 1870. However, near the headquarters there were some quick-firing light field pieces, which are handled by a specially trained detachment.

There is a good Filipino band. All the members were originally Filipinos; now there are some Malays or Dyaks.

The target range, for two targets up to 500 yards, was good.

This force is attractive in appearance, but is not, I understand, used extensively in field service.

Cost of the military for one year, 1903, $86,264.45.

For punishing the wild head hunters near the border of Dutch Borneo, and putting down insurrections, disorders, and invasions the native volunteer force is used. The rajah designates the officers to lead the expeditions, generally the resident near the disturbed section of country. These call on the Dyak, Malay, and other native chiefs to furnish so many thousand men. There was an expedition to start during my visit, which was to consist of from 6,000 to 10,000 men, led by about five white officers. The volunteer forces assemble in long canoes, each made from the trunk of a single tree, some of them carrying 125 paddlers. They provide their own arms and food, and necessarily fight after their own fashion. It was in this way that the first rajah enlarged his domain and put down disorder. The present rajah was on many such expeditions while he was still a subordinate officer of the government. A little over a year ago 1,000 men died from cholera on such an expedition. A time of the year is generally selected that will not interfere with the planting or gathering of the crops.

The following are uniquely expressed laws:

XI.

Military scale of pay and allowances, etc., in Sarawak government service:

Sergeants, $10 per month; corporals, $8 per month; privates, $6 per month.

Rise of pay: Every three years of half a dollar, if character is very good, up to the ninth year.

Rations: Not found, unless on actual service.

Clothes: Two suits of uniform found a year; not found in other clothing.

Arms: Arms and equipments found.

Furlough: After serving five years, leave is permitted for one year without pay.

Passages: Found to and fro.

Pension: After twenty-one years of actual service, on half pay.

Retirement: The option is of resigning or going on furlough after the term of enlistment has expired.

Order by his highness the rajah.

August, 1875.

XII.

As an inducement to good men serving long periods as privates, I hereby direct that after fourteen years' service they are, provided they are not raised to corporals or sergeants, to get a rise or allowance of $1 per mensem, and again after sixteen years' service to get 50 cents extra per mensem, making their maximum pay and allowance $10 per mensem.

Order by his highness the rajah.

May 28, 1889.

XIII.

The order of November, 1890, is hereby canceled.

1. It is hereby directed that any one of the rangers who has served for three years without having committed any serious or repeated number of small offenses marked against him in the regimental book shall be entitled to 50 cents a month good-conduct allowance, with one stripe on his wrist.

2. If another term of three years is served with the same character of good conduct, he will be entitled to wear two stripes and will receive an extra $1 a month, making a total of good-conduct allowance to $1.50 a month.

Order by his highness the rajah.

January 4, 1889.

XIV.

It is hereby directed that if any leave is granted to Sarawak Rangers whilst at outstations, it is to be reported to the commandant when the guard is relieved.

The rule is that each man is entitled to fifteen days each year on full pay, whether in an outstation or in Kuching.

Order by his highness the rajah.

March 22, 1889.

XV.

It is hereby directed that the following regulations are to come into force dating from this day:

Sergeants having served over five years will be entitled to an allowance of $2 a month

Sergeants having served over ten years with unexceptionable good characters will be entitled to an allowance of $2 extra a month and to wear a ribbon clasp as a badge of good conduct.

Sergeants having served over twelve years unexceptionable good conduct will be entitled to $1 extra a month and to wear a silver good-conduct long-service medal on the ribbon.

Full corporals serving over ten years will be entitled to $2 extra allowance a month.

(These allowances do not add to the half pay.)

Order by his highness the rajah.

June 10, 1890.

JAVA.

THE MILITARY.

There are 50,000 troops in the Dutch East Indies. Lieutenant-General Von Houst is military governor of Sumatra. Lieut. Gen. W. Boetje is commander in chief of the forces in Java and of the other islands, with the exception of Sumatra. A little more than half of these troops are natives, some of whom are said to be very good.

The garrison of Batavia is almost ideal. Weltevreden, the resident suburb of Batavia, is like a beautiful park, as are many of the towns of Java. In the midst of it, about a half mile apart, are two large grass plains, Waterloo Plein and Koningsplein. About the former and in its immediate vicinity are the quarters of the officers and the barracks of the men. Fortress artillery, mountain and field artillery, cavalry, and infantry form the garrison. As a rule, each battalion of four companies has two companies of white troops and two of native. For uniforms they have dark-blue flannel or serge, trimmed with orange, generally braided across the front, and with three rows of buttons, which are different for the different arms. Rank is indicated by the number of stars on the collar and sleeve. For full dress a black helmet similar to our old infantry helmet is used. In addition to this they have a white uniform, worn by officers not with troops under arms, and what they call an Achin uniform, which is used in campaigns in Sumatra—a plain, simple blouse and trousers with buttoned canvas leggings.

I witnessed the drill of a cavalry troop on the Waterloo-Plein, which probably contains 60 acres. They are using Australian and native ponies, the latter being quite small. The saddle is very high, pigskin, with high cantle and pommel, much like our ancient artillery saddle, and sets high above the horse's back. They use double reins. The drill was rather good of its kind. It was an old-fashioned drill, two ranks, wheelings instead of turnings. They are armed with a carbine hung on the back, a poor revolver, and saber. It did not appear to be a very efficient force, but was doubtless good for the purposes required.

The American consul-general, Mr. Rearden, is popular in Batavia, where he has lived for many years. He accompanied me, by appointment, to call on Lieutenant-General Boetje. The General is comparatively a young man, although he has perfectly white hair. He was particularly cordial, spoke English very well, and said that he would arrange for me to see as much as I wished of his command.

I also called on the commander of the garrison.

That evening at the hotel, Captain Lambrechtsen, of the infantry, called, and said he had been directed by the colonel commanding the garrison to show me about. Lieutenant-General Boetje returned my call at the hotel, in uniform, wearing his medals, one of which was the Iron Cross, and a beautiful saber of honor, which had been presented to him for his success and gallantry in Sumatra, where the Dutch have been fighting for thirty-one years against the Achinese and other tribes. The Achinese war is now said to be nearly at an end, but lately in Singapore I read an account of a rather severe fight which occurred during my visit to Java, in which the Dutch were victorious, although they suffered some losses. The photographs of the Achinese that I saw make them look like intelligent Italian brigands—good noses, eyes, and high cheek bones.

Captain Van Der Waarden, of the artillery, to whom I introduced myself, was particularly courteous. He and Captain Lambrechtsen arranged to show me everything of interest about Batavia.

At half-past 6 the next morning Captain Lambrechtsen called for me in a carriage to take me to witness a very pretty ceremony, the presentation of medals of honor, the Iron Cross, awarded to a major and four soldiers for distinguished gallantry in Sumatra on the Djamba campaign. We arrived in Waterloo-Plein and found two battalions of infantry, a battalion of fortress artillery, and a squadron of cavalry, drawn up on three sides of a hollow square. The commander in chief, the admiral, and their staffs, and all the officers and soldiers who had previously earned the cross, stood on the fourth side. At the hour

appointed, 7 o'clock, the colonel rode up on a pony, attention was sounded, and he immediately proceeded to the inspection of the troops, after which he closed them into a smaller square. Those to receive the cross then advanced, as did the general, the admiral, and the other officers with them, who formed in line in the rear of the recipients. From the right the field music then sounded in turn "attention to orders." The colonel dismounted and spoke to the troops and to those to be decorated, after which he pinned on the crosses. Then the general, the admiral, their staffs, and all of the officers and soldiers who had received the cross went up and shook hands with the new members of the order. After which all officers left their commands and came forward and shook hands, congratulating the lucky recipients of the cross. They then returned to their troops and the field music of each battalion sounded a call to indicate that the reading of orders was over. The troops were formed into columns and passed in review before the five just decorated. It was very well done by some of the companies, and not so well by others. Captain Lambrechtsen told me that the Dutch regulations require the goose step passing the reviewing officer. Only one officer, however, attempted this, and he was laughed at by the spectators. That is the reason probably that it is not insisted upon by the authorities. The full dress appeared very warm for the Tropics. The officers wore red sashes, and mounted officers and men long trousers, no boots and no leggings.

One of the recipients of the cross was a discharged soldier. He wore a frock coat and silk hat.

After breakfast Captain Lambrechtsen again called for me and took me to visit the infantry barracks. These were inclosed by a high wall on three sides, painted the military yellow or buff color. The fourth side is a canal. There are three gates to the square.

The barracks are one-story buildings, as are all houses in Java. Each company has a long, well-ventilated, tiled roof building, with cement floors and wide verandas on either side, the floors, including those of the verandas, with just enough fall from the center to allow the water to run off. The ventilation is particularly good, and the quarters of the native troops very clean, much more so than those of the white troops. Noncommissioned officers have separate rooms. There are orderly rooms and storerooms. The Dutch find that it is better to allow their men to have their women with them. The white soldiers are not permitted to marry the native women. Each soldier has a bed like a table, on two wooden horses some 4 feet high. On this he has his blankets and pillows and those of his woman. They sleep on the floor under the table or bunk, with a thick mosquito curtain inclosing them. There is a small locker at the foot of the bunk. The accouterments are simple. In one company there were 60 women and 110 children. These the government rations when the company is absent in field service. The women are allowed in the barracks at all times, except during hours set apart for inspection; then they may stay in tile-covered sheds, which are provided, and in this case were near the kitchens.

The kitchens and rears were near a swift-running canal, the rears over the same. Their food was well cooked and palatable, consisting, for the native soldier, of about a quart and a half of rice, sambals, dried fish, or fish with chili, and a piece of meat The women have almost the same, for which I understand the soldier pays. There is a kitchen for noncommissioned officers for each battalion, with a dining room attached, so that they could sit down at a table for their meals. There were some women cleaning up in one of these when I was there. It may be that they wait on the table.

For actual service in action, each soldier is provided with a very strong, short sword, with a basket guard. The principle that they are now using in fighting natives is to fire once and then charge with the sword. They say that this has brought them success.

The field artillery barracks are near by. They were not on parade, as they suffered severe losses lately from sura, and had not enough animals for the guns. They use an old pattern Krupp gun. The companies are large, about 150 men. For service and on drills and exercises not nearly this number is turned out. For instance, on this day some 25 to 30 men were absent from those companies about which I inquired.

There is an excellent canteen and so-called soldiers' home for the soldiers near the barracks. In the former any sort of liquor is sold to the soldiers at low prices. At the latter, which is a new venture, no intoxicant is sold. There were a large number of soldiers in these buildings, which are the best for the purpose I have ever seen. They were very large, with two wings and wide verandas, floored in Italian marble, in black and white squares (about 18 inches), one wing for the noncommissioned officers and one for the privates. In the canteen there is a large theater, and a bowling alley is attached. The "home" has a bowling alley. Both have billiard tables, separate ones for the noncommissioned officers. Captain Lambrechtsen stated that the home was proving a success. When we made our visits, however, there were more soldiers at the canteen than at the home.

This quartering of soldiers in a city has many advantages. They have all the attractions of civilization at hand. They are paid often, and there is little dissipation. From a Government standpoint it is economical. Transportation and roads are reduced to a minimum. From the officers' standpoint they have all the comforts of a good home—good houses,

good cheap servants, and the best that the market can afford. In return for this much hard work is done, and the officers earn their pay. Some close-order drill is done on the plains above mentioned, but three or four times a week each command goes out for many miles into the country, where they have field exercises, and all the instruction required for marching. They go out into the country by company, by battalion, and by brigade. The mornings are devoted to instruction, especially in marching and in service conditions, the afternoons to administration and schools.

The military topographical department is excellent, under the charge of very competent officers. The troops do a great deal of topographical work, as do their trained corps of topographers, and the topographical maps of Java are excellent, equaling in many cases those of European countries. They have won for their excellent work a gold medal at Paris and medals and diplomas at three other of the world's expositions. Their draftsmen are natives and half-castes. A number of half-castes are commissioned officers among the native companies.

The military hospital at Batavia, although an old one, is excellent. It is built in the same manner as the barracks, a number of long wards opening on a covered cement path or gallery down the middle of the inclosure, with a ward for white and one for native officers, and one for the families of officers. There is a large corps of doctors and assistants. One operating room was very clean and neat, with women nurses in attendance. There is another operating room for septic operations, and this was not so clean. Sander's apparatus for convalescents, especially for the wounded, was installed under a competent Swedish or Danish physician. There were a large number of beriberi patients in one ward. The doctors said that these were sent during this season at once to the hospitals in the hills, especially at Tjimahi, where the government has its newest and finest hospital. The kitchen was particularly interesting, large and clean. The meals are excellent, with a good supply of rice and beef tea. They told me that they served 400 chickens a day. There are from 500 to 600 patients. The wards are all tile roofed and cement floored, with wide verandas and excellent ventilation.

In the newer hospitals and barracks the walls are of heavy bamboo matting, which in case of contagious diseases can be burned and the rest of the building disinfected.

There was also a convalescent barracks, to which soldiers returning from campaigns were sent to stay for several months to recuperate. These were given light exercise and were allowed a number of privileges.

The Dutch are now removing their large supply depots and garrisons from the coast towns, such as Samarang, and putting them in the mountains, on the theory that in case of an attack by a foreign power they would be able to have sufficient munitions of war at the mountain stations to successfully resist an invasion. The barracks at Tjimahi and Salatiga are excellent. These have been reported on before, and plans of the barracks at the former place are on file at division headquarters in Manila.

The climate in the hills is exceedingly agreeable.

At Tjimahi there is infantry; at Salatiga, cavalry and mountain artillery.

The engineers build all fortifications, barracks, and other buildings. Their barracks average in cost about 10,000 guilders each.

There are many officers who serve always in the colonial army. However, there were a number seconded from the army in Holland, who come out for at least five years at a time. Captain Lambrechtsen was one of these.

POLICE.

The police of Java are slouchy in appearance, with baggy blue uniforms and yellow trimmings. They do good work in a way. No native is permitted to go from one place to another except by written permission. Evildoers are frequently taken at night in the houses where they have taken refuge, through the excellent system of the native headmen of villages and wards.

There is a law in Java which requires all Europeans to become members of a reserve force (militia) and to receive a certain number of hours per year instruction. This method is not popular among many of the foreigners, especially English. I did not learn the details of the system.

THE FEDERATED MALAY STATES.

MILITARY.

The military force of the Federated Malay States consists of a regiment called the "Malay States Guides," to which is attached an artillery corps. It is composed almost entirely of Sikhs and Pathans. The latter are sometimes spoken of as the Mohammedan Sikhs, and do not wear beards. Both Sikhs and Pathans are splendid looking men, and their profession is soldiering. They are very submissive to discipline, careful, and proud of all the forms and ceremonies. They are said, however, to lack initiative, and although fight bravely,

when well led, still the moment they are deprived of their white leaders their value in a large measure is gone. The field and most of the company officers are those of lower grade from the British army. The lieutenant-colonel commanding is a very energetic and active man and one of great ability. The adjutant, Capt. E. I. M. Barrett, of the Lancaster Fusileers, is an especially energetic and capable officer. There are a number of native officers. The regiment is about 1,000 strong, quartered as follows: Two companies at Kuala Lumpur, state of Selangor, and six companies and headquarters at Taiping, in the state of Perak. They are uniformed with the handsome turbans, and even their khaki uniform is striking. For dress occasions they have the British red coat. For the field their equipment is very simple. They use a khaki cloth haversack, which has the advantage of being cheap, and perhaps is durable enough for their service. They have for fatigue work a light-blue flannel shirt without a collar and a handsome green turban. The British resident of each of the four native states has a guard furnished from this regiment, principally for display. The sultan and many of the native chiefs are received with guards of honor whenever they visit the resident or the state capital.

The target range at Taiping is one of the best I have ever seen. The long-distance firing is up to 1,200 yards. The butts are against a mountain. This figure shows a cross section. The overhanging cover enables the space between the butt and the target to be small, thus preventing the loss of many otherwise good shots.

The targets were on an upright iron frame and had vertical motion, working on chains over wheels at the top. These frames or stands permitted three sizes of targets to be used. The butt was floored with cement; the cover was upheld by iron posts and iron rails. Like everything else in the British and Dutch colonies, the targets and the butts were nicely painted or whitewashed. One of the main advantages of the range was that it approached service conditions, the jungle on either side, the rough ground, and shooting over a road which crosses the range at 500 yards. There were many disappearing targets very simply arranged, some on the open ground, some imitation men behind breastworks or shelter, a gun with silhouette cannoneers, a track running across a portion of the range on which an imitation armored car with a gun and crew, offered fine moving target. Another target arrangement, representing a column of troops marching down a hill toward the shots, was suspended on a wire, and consisted of a number of groups of silhouette figures arranged as in a column of troops. There was a painted canvas on a frame to represent the front of a house, with a window and a door which could be opened and shut, presenting the figure of a soldier in the window and in the doorway. A very simple moving target was the silhouette of a soldier creeping, with his gun carried about the knees. This was on a light frame about 4 feet square, and was carried on a pole like the signs which one sees carried about in the streets. A man carrying this moves up and down behind the butt. The target appearing above the latter makes a very good moving objective.

Captain Barrett and the soldiers were particularly good shots, especially those that I saw, which were the best from each company practicing at competition targets for a match to be shot off in a few days between that garrison and the garrison at Singapore. Officers from each garrison were sent to the other to watch the firing of the competitors. The teams shot at the same hour on the appointed day at Taiping and Singapore, and the results were telegraphed. In addition to these matches they have regular competitions similar to ours.

In Singapore the troops are a regiment of British infantry, one of Madras infantry (native soldiers from India), and artillery, both British and native. These serve a tour in Singapore of so many years. The armament of the coast defenses about Singapore is said to be very good. The artillery were doing some excellent shooting with rapid-fire guns at a moving target at the western entrance as we passed on the steamer.

I dined with Captain Anderson, adjutant of the Madras regiment and member of the Indian staff corps, at Alexandria barracks, where they are to erect new permanent barracks for the native infantry.

The officers at present are living in nipa shacks about like the temporary shelters used by our officers in the Philippines. They have excellent lawns and many flowers about the houses.

He said that many of the natives of India were excellent shots, much better shots than the British soldiers as a rule, and for that reason there was a different course of instruction for the native and the white troops in order that the two could not be compared by the natives in favor of themselves.

To encourage interest among the European residents in the Malay States and the Straits Settlements the government invites them to use the target ranges, to receive instruction from the military, and supplies them with an annual allowance of ammunition for use on the range and the use of government service rifles.

In the English colonies in the Tropics the army officers use a very simple, inexpensive, and neat mess jacket, with the same collar and strap ornaments as are used on the khaki

or white blouses. This custom enables one to dress for the evening in a cool dinner dress which answers every requirement in that warm climate.

The police of the Malay states is formed of Sikhs, Pathans, and Malays. The Malays are perhaps not so trustworthy, but are said to have more brains than the Sikhs, and they will often assume responsibilities and direct the Sikhs in emergencies when the Sikhs are waiting for orders and are willing to obey anyone who will assume to give them orders. The system of constabulary and police for the Malay states, although the material is not of the best, is creditable. They are used extensively in patrolling the roads. The police always look clean and soldierly.

There are small police stations all about the country. The court rooms, which are in simple, small, open buildings, are near the police stations. The latter are clean and well suited to the purpose. The magistrates, who are designated by the resident, generally, in addition to their other duties as district administrative officials, move about constantly and appear at generally fixed dates at the various places where they hold court. In each police station there is a lockup for the temporary safe-keeping of prisoners.

The uniform is kahki with canvas puttees.

The constabulary and police regulations are taken from the Indian government and adapted to use in the Malay states.

The so-called Kitchener helmet is an excellent headdress, both with kahki and white. For comfort and appearance it is the most attractive head gear I have seen in the Tropics.

I noticed carefully many British soldiers dressed in their khaki. They were, as a rule, not so well set up nor as fine looking as our men, nor were their clothes of as natty a cut as those that our neatest men wear. But their helmets gave them a striking military appearance.

The same is true of the officers, both in white and khaki.

All of these native troops are comparatively inexpensive, and efforts are made to keep them so.



INDEX.

ABELLA, DR. LUIS, medical inspector:
Report on inspection of province of Bataan: 219–222.
Report of special sanitary inspection of the province of Zambales: 266–269.
AGRICULTURAL COLLEGE AND EXPERIMENT STATION:
Acreage of: 72, 499.
Acreage under cultivation: 499, 521.
Broom corn: 520.
Buildings, construction of: 499.
Cane planting: 517.
Cultivation: 50, 72, 500, 517.
Capital: 518.
Coffee and tobacco: 520.
Corn: 520.
Fertilization: 518.
Fiber machinery: 519.
Fibers—
Cultivation of: 519–520.
Cotton: 519.
Hemp: 519.
Forage: 520.
Grasshoppers: 520.
History: 516.
Improvements: 520.
Labor: 518.
Prospects for self-support: 516.
Railroads: 518.
Rainfall: 521.
Refinery: 72.
Seed distribution: 520.
Sugar cane, how raised: 72, 500–501, 516.
Harvest: 517.
Planting of: 517.
Refinery: 72.
Sugar mill, need of: 516.
Trees, how to protect valleys from washing: 519.
AGRICULTURE, BUREAU OF:
Agricultural college and experiment station in Negros—
Acreage of farm: 499.
Buildings, construction of: 499.
Cultivated area: 499.
Sugar cane, cultivation of: 500–501.
Batangas station, work of: 493.
Beef bulls—
Breeding of: 488.
Importation of: 487, 488.
Cassava (Manihot utilissima), cultivation of: 502, 503.
Castor bean, cultivation of: 503.
Cattle, importation of: 481, 482–486.
Cocoanuts, use and value of: 538–541.

AGRICULTURE, BUREAU OF—Continued.
Cocoanut industry, report on: 538–541.
Cocoanut oil, use and value of: 540.
Coffee plantation, management of: 68, 493, 494.
Copra, value of: 538, 541.
Corn, cultivation of: 503.
Cotton, cultivation and production of: 493.
Cullon stock farm, management of: 488, 489.
Dairy farm, establishment of: 61.
Employees: 61, 480.
Experiment stations, reports of—
Agricultural College and Experiment Station—
Acreage of: 72, 499.
Acreage under cultivation: 499, 521.
Broom corn: 520.
Buildings, construction of: 499.
Cane planting: 517.
Cultivation: 50, 72, 500, 517.
Capital: 518.
Coffee and tobacco: 520.
Corn: 520.
Fertilization: 518.
Fiber machinery: 519.
Fibers—
Cotton: 519.
Cultivation of: 519–520.
Hemp: 519.
Forage: 520.
Grasshoppers: 520.
History: 516.
Improvements: 520.
Labor: 518.
Prospects for self-support: 516.
Railroads: 518.
Rainfall: 521.
Refinery: 72.
Seed distribution: 520.
Sugar cane, how raised: 72, 500–501, 516.
Harvest: 517.
Planting of: 517.
Refinery: 72.
Sugar mill, need of: 516.
Trees, how to protect valleys from washing: 519.
Baguio and Trinidad experiment stations—
Acreage under cultivation: 69.
Crops: 68, 69.
Soil conditions: 68.
Batangas Station—
Cotton raising: 67.
Crops: 67–68.
Peanuts: 68.
Vegetables: 67.
Soil conditions: 67.
Work of: 483.
Rice farm, Murcia, Tarlac—
Acreage: 495.
Acreage under cultivation: 69.
Buildings: 69.
Crops, condition of: 495.
Draft animals: 69.
Japanese rice, cultivation of: 69.
Labor, efficiency and price of: 69, 496, 497.
Machinery: 70.
Panay, report on thrashing of: 513–514.
Rice, methods of planting: 69.
Rice, thrashing of: 69, 70.
Situation of: 495.

AGRICULTURE, BUREAU OF—Continued.
Experiment stations, report of—Continued.
Rice farm, Murcia, Tarlac—Continued.
Soil conditions: 69, 495.
Steam plow, use of: 497, 498.
Steam thrasher, work accomplished: 69.
Superintendent, report of: 511–513.
Crops: 511.
Employees: 511.
Horses received: 511, 512.
Irrigation: 511.
Labor: 513.
Rice cultivation: 511, 512.
San Ramon farm, Mindanao—
Acreage of: 70, 498.
Cocoanut plants, cultivation and sale of: 71, 72, 499.
Condition of: 70.
Cultivation of—
Cocoanuts: 70, 71.
Copra: 70.
Hemp: 70, 71, 499.
Difficulties experienced in transportation and labor: 71.
Disposition of property, recommendations: 71.
Irrigation: 499.
Land available for cultivation: 498.
Recommendations of General Wood: 71, 72.
Superintendent, report of: 514–516.
Cultivation of—
Alfalfa: 515.
Cacao: 515.
Cocoanuts: 514.
Hemp: 515.
Vegetables: 515.
Expenses: 516.
Rainfall: 515.
Singalong experiment station, Manila—
Acreage of: 66.
Equipment: 67.
Products raised: 66, 67.
Forage crops: 66.
Sorghum and Kaffir corn: 66.
Soy beans: 67.
Sulla: 67.
Velvet beans: 67.
Farms operated by: 4.
Fiber investigations—
Work accomplished: 501–502.
Cotton: 502.
Hemp: 501.
(See also FIBER INVESTIGATIONS.)
Forage crops—
Cultivation of: 490–492.
Prices of: 490, 491.
Fowls, importation and breeding of: 486, 487.
Labor—
Condition of: 496, 497.
Price of: 496.
Lecture work, plans for: 504.
Live stock, importation of: 481–486.
Milk, quantities and prices: 482, 483.
Moro province, conditions in: 588, 589.
Palay, report relative to thrashing on Government rice farm: 513–514.
Personnel, changes in: 480.
Publications: 74.
Report of chief of: 480–540.

AGRICULTURE, BUREAU OF—Continued.
Rice—
Transplanting of: 495.
Time for: 495.
Work, how accomplished: 495, 496.
Seed—
Distribution of: 509–510.
Varieties: 510.
Seed and plant introduction, progress of work of: 67, 492, 493.
Sheep, raising of: 504.
Soil physicist—
Report on soil and agricultural conditions: 521–531.
Baguio and Benguet: 521–528.
Crops grown and methods of cultivation in use: 527–529.
Camote: 527.
Coffee: 527.
Potato: 527.
Rice: 527.
Tobacco: 528.
Harvesting and curing: 529.
Yield: 529.
General physiography: 521.
Soils: 522–526.
Chemical analyses: 525.
Mechanical analyses: 522–524.
Methods of: 523.
Water soluble contents of: 525–526.
Cagayan Valley, Luzon, investigations in: 527–531.
Methods of cultivation in use: 528.
Soils: 529–531.
Character of: 529–530.
Chemical analyses: 530.
Mechanical analyses: 530.
Water-soluble contents of: 531.
Worming: 529.
Steam plow, benefits from use of: 497, 498.
Stock farm, government—
Report of manager of: 505–508.
Breeding cattle: 506.
Buildings: 505.
Experimental work: 507–508.
Native labor: 507.
Stock: 505.
Water supply: 506.
Surplus products, sale of: 481.
Tanning and leather establishments, establishment of: 503.
Trinidad and Baguio experiment station—
Crops, cultivation of: 494.
Prospects of: 494, 495.
Soil conditions: 494.
Wool, production of: 504.
Work accomplished: 481, 482.
AHERN, GEORGE P., captain, Ninth U. S. Infantry, chief bureau of forestry:
Report of: 528–378.
ALBAY, PROVINCE OF:
Sanitary inspections, report of: 219–222.
Cholera epidemic: 221–222.
Customs and habits of people: 222.
Municipal boards of health: 220–221.
Provincial board of health: 219.
ALEMANY, DR. JOSÉ:
Mentioned: 151.
ALFALFA:
Cultivation and price of: 490, 491.
ALGUÉ, JOSÉ, S. J., director of Philippine weather bureau:
Report of: 542–560.
Visit to United States: 74.

AMBOS CAMARINES, PROVINCE OF:
Cholera—
Methods adopted against spread of: 120–125.
Circulars issued: 121–125.
Quarantine measures adopted: 120.
AMEBAE:
Study of: 420.
AMERICANS:
Births, number of: 5.
Death rate of: 5.
Health of: 148.
AMŒBIC DYSENTERY:
Prevalence of: 25, 26.
ANIMALS:
Effect of work of veterinary division: 150.
Examination of: 20.
Immunization of: 62.
Result of: 62.
Importation of: 61, 62, 63.
Purchase of, for laboratory work: 450.
(See also CATTLE, *and* VETERINARIAN.)
ANTHRAX:
Preliminary report on presence of, in Philippine Islands, by R. H. McMullen, veterinarian—
Biological properties of bacilli: 208.
Spores: 208.
Cause: 208.
Diagnosis: 209.
Distribution and source of infection: 208.
History of disease: 207–208.
Morbid anatomy and pathology: 209.
Prevention: 209–210.
Symptoms: 209.
Treatment: 209.
ANTIMONY:
Deposits of: 402.
ARMY:
Cholera, cases and deaths from: 131, 132.
ASIATIC CHOLERA. (See CHOLERA.)
ASSAYS:
Transfer of work of making: 36, 382.
AUGUSTINIAN RELATIONS OF NORTERN LUZON:
Publication of paper on: 79, 566.
BAGUIO, BENGUET:
Civil sanitarium. (See CIVIL SANITARIUM, BAGUIO, BENGUET.)
BAGUIO AND BENGUET:
Report on soil and agricultural conditions: 521–528.
Crops grown and methods of cultivation in use: 527–529.
Camote: 527.
Coffee: 527.
General physiography: 521.
Potato: 527.
Rice: 527.
Soils: 522–526.
Chemical analyses: 525.
Mechanical analyses: 522–524.
Methods of: 523.
Water soluble contents of: 525–526.
Tobacco: 528.
Harvesting and curing: 529.
Yield: 529.
BAGUIO AND TRINIDAD EXPERIMENT STATIONS:
Acreage under cultivation: 69.
Crops: 68, 69.
Soil conditions: 68.
BANKS, CHARLES S., entomologist:
Mentioned; 51, 416.

BAROCYCLONOMETER:
Publication of paper on: 543.
BARROWS, DR. DAVID P.:
Mentioned: 77.
BARTLETT, DR. ROBERT L., medical inspector:
Report of special sanitary inspection of the provinces of Surigao, Leyte, and Samar: 259–264.
BATAAN, PROVINCE OF:
Report on sanitary inspection of: 219–222.
Cholera epidemics: 221–222.
Customs and habits of people: 222.
Municipal boards of health: 220–221.
Provincial board of health: 219.
BATAKS OF PARAGUA:
Brief report on, publication of: 79, 566.
BATANGAS STATION:
Cotton raising: 67.
Crops: 67–68.
Peanuts: 68.
Vegetables: 67.
Soil conditions: 67.
Work of: 483.
BATH HOUSES:
Need of: 6, 90.
BEARD, STEPHEN R., treasurer district of Cotabato, Moro Province:
Mentioned: 573, 594.
BEESWAX:
Quantity taken from public lands: 372.
BENGUET, PROVINCE OF:
Sanitary inspections, report of: 256–259.
Benguet road: 257.
Cholera, death rate: 256.
Diseases among domestic animals: 257.
Smallpox epidemic: 257.
BERIBERI:
Cause of: 94.
Deaths from 94.
Prevalence of: 93.
Treatment: 94.
BILIBID PRISON:
Death rate in: 20, 147.
Mortality: 181.
Number of prisoners: 147.
Report of resident physician: 217–218.
Beriberi: 218.
Examinations made: 218.
Pneumonia: 217.
Causes of: 217–218.
Recommendations to prevent: 218.
Prisoners, number of: 217.
Smallpox: 217.
Visits for treatment of diseases: 217.
Sanitary condition of: 180, 181.
BIRTHS:
Nationalities of: 86.
Number of, in Manila: 85.
Nationalities of: 86.
Rate of: 85.
Records of: 85.
Statistics of: 158.
Difficulties encountered in securing: 85.
Methods adopted to remedy: 85.
BOLTON, EDWARD C., first lieutenant, Seventeenth Infantry, governor, district of Davao, Moro Province:
Mentioned: 573, 594.
BONTOC IGOROT:
Publication of paper on: 78, 565.

BOTANIST:
Report of: 461–466.
Exchange and distribution of duplicate material: 462–463.
Herbarium, specimens for: 461.
Foreign: 461.
Philippine: 461–462.
Identification of botanical material: 462.
Investigations made: 461.
Lamao, investigation of flora of: 465.
Material from outside sources: 463.
Publications: 464.
Recommendations: 466.
Work for Philippine exposition board: 464.
Work on Philippine flora: 421, 464.
BOTANY:
Work of collectors: 351, 352.
BRICKS AND POTTERY:
Manufacture of: 41.
BROOM CORN:
Cultivation of: 520.
BUBONIC PLAGUE:
Appearance in Cebu: 12.
Cases, number of: 11.
Inoculations against: 175.
Curative (antitoxin) serum: 175.
Preventative (prophylactic) serum: 175.
Prevalence of: 4.
Serum for, effects of: 11.
Vessels disinfected: 23.
BUILDING STONE:
Location of: 404.
BULLARD, ROBERT J., major, Twenty-eighth Infantry, governor, district of Lanao, Moro Province:
Mentioned: 572, 594.
BULLS:
Importation and price of: 65.
BURRITT, CHAS. H.:
Mentioned: 35, 380.
CAGAYAN VALLEY, LUZON:
Report on soil and agricultural investigations: 527–531.
Methods of cultivation in use: 528.
Soils: 529–531.
Character of: 529–530.
Chemical analyses: 530.
Mechanical analyses: 530.
Water, soluble contents of: 531.
CALHOUN, CARSON:
Mentioned: 562.
CAMPHOR TREES:
Results of tests of: 369.
CAÑIZARES, CIRILO, chief sanitary inspector:
Death of: 187.
CARABAOS:
Importation of: 20.
CARTER, DR. E. C., major and surgeon, U. S. A., commissioner of public health:
Report of: 83–269.
Work of: 21.
CASEY, DR. H. L.:
Mentioned: 63, 485.
CASSAVA (MANIHOT UTILISSIMA):
Cultivation of: 502, 503.
Investigations into growth of: 73.
CASTOR BEAN:
Cultivation of: 74, 503.
CATTLE:
Appropriation for purchase of: 482.
Chinese, breeding of: 489.

CATTLE—Continued.
Diseases. (See VETERINARIAN.)
Food for: 62.
Hogs, importation of: 64, 484–486.
Importation of: 64, 481, 482–485, 487, 488.
Jersey, importation of: 64, 481, 482, 485–486.
Losses from disease: 483.
(See also ANIMALS.)
CAVITE, PROVINCE OF:
Sanitary inspections, report of: 222–231.
Animal disease: 231.
Mortality statistics: 224–231.
Beriberi: 230.
Death rate: 225.
Dysentery: 230.
Fevers: 226–227.
Gastro-enteritis: 228.
Infantile convulsions: 226.
Smallpox: 227.
Tuberculosis: 229.
Municipal boards of health: 222–224.
Provincial board of health: 222.
Sanitary condition of towns: 231.
CEBU, CITY OF:
Bubonic plague, appearance of: 12.
Sanitary inspections, report of: 231–236.
Bubonic plague, 236.
Death and birth certificates: 233.
Escolta district: 234, 235.
Hospitals: 234.
Leper hospitals: 232.
Buildings: 232.
Guards: 232.
Patients: 232.
Licenses: 234.
Markets: 234.
Municipal board of health: 232.
Prostitution: 233.
Rinderpest: 236.
Street cleaning: 233.
CEBU LEPER HOSPITAL:
Report of superintendent: 218–219.
Diseases among lepers: 218.
Inspections: 218–219.
Patients, number of: 218.
CEBU, PORT OF:
Quarantine station, establishment of: 23, 24.
Report on quarantine transactions: 294–295.
CEDULA TAXES:
Moro Province: 581.
CHARCOAL:
Quantity taken from public lands: 372.
CHICKENS. (See FOWLS.)
CHINESE:
Susceptibility to Bubonic plague: 5.
CHINESE HOSPITAL FOR CONTAGIOUS DISEASES:
Report of medical superintendent of: 216–217.
Cholera hospital: 217.
Maintenance: 217.
Plague hospital: 216–217.
Smallpox hospital: 217.
Staff: 217.
CHOLERA:
Appearance and prevalence of, in provinces—
Abra: 131.
Albay: 128, 131.

CHOLERA—Continued.
Appearance and prevalence of, in provinces—Continued.
Ambos Camarines: 119–125.
Antique: 131, 131.
Bataan: 131.
Batangas: 127, 131.
Benguet: 128, 131.
Bohol: 128, 131.
Bulacan: 119, 131.
Cagayan: 129, 131.
Capiz: 129, 131.
Cavite: 131.
Cebu: 131.
Ilocos Norte: 128, 131.
Ilocos Sur: 127, 131.
Iloilo: 129, 131.
Isabela: 130, 131.
Laguna, La: 127, 131.
Leyte: 131.
Masbate: 130.
Mindoro: 131.
Misamis: 129.
Negros Occidental: 128, 131.
Negros Oriental: 131.
Nueva Ecija: 131.
Nueva Viscaya: 131.
Pampanga: 126, 131.
Pangasinan: 127, 131.
Paragua: 130.
Rizal: 119, 131.
Romblon: 130, 131.
Samar: 131.
Sorsogon: 127, 131.
Surigao: 130, 131.
Tarlac: 126–131.
Tayabas: 131.
Union, La: 127, 131.
Zambales: 131.
Zamboanga: 131.
Army, cases in: 131.
Deaths from: 132.
Cases reported: 111–113, 114.
Circulars prescribing precautions against: 121–125.
Spanish methods: 123.
Deaths from, cause of: 5, 114, 115.
Disappearance of: 4, 11, 132.
Epidemic of 1902, appearance of: 11, 111.
Hospital, establishment of: 117.
Inspections: 115, 116.
Manila, cases reported: 167–199.
Outbreak of: 111.
Precautions measures: 115, 116, 121–125.
Spanish—
Rules of general hygiene: 123–124.
Rules of personal hygiene: 124.
Rules for patient: 125.
Rules for application of chemical agents: 125.
Rules for disinfection of clothing: 126.
Provinces, cases and deaths in: 131, 168, 169.
Quarantine against: 117.
Treatment: 117.
CHRISTIE, EMERSON:
Ethnological investigations of: 78.
CIVIL HOSPITAL:
Admissions: 26.
Amœbic dysentery, cases treated: 25, 26.

CIVIL HOSPITAL—Continued.
Cases treated: 302–305.
Dairy, establishment of: 307.
Deaths, number and cause: 305.
Maternity ward, increased accommodation needed: 26.
Nationality of cases treated: 26.
Nurses, training of Filipinos: 26.
Patients, status of: 305.
Nationality of: 306.
Patients treated: 19.
Prescriptions filled: 306.
Report of attending physician and surgeon: 302–306.
Sanitary condition of: 186.
Value of medicine furnished employees: 306.
Work of: 24–26.
CIVIL SANITARIUM, BAGUIO, BENGUET:
Attendance: 27.
Buildings, construction of: 27.
Construction and repairs to: 321–322.
New, recommended: 30.
Cases treated: 309–313.
Nationality of: 28, 309.
Communications, roads, and trails to: 26.
Disbursements: 308, 309.
Diseases treated: 313–318.
Beriberi: 28, 313.
Bronchitis: 28, 314.
Dysentery: 28, 29, 314–315.
Precautions against: 29.
Indigestion: 315–316.
Influenza: 316.
Malaria: 316.
Meningitis, cerebro-spinal, epidemic: 316–317.
Parasites, intestinal: 317.
Rheumatism: 317.
Skin diseases: 317.
Smallpox: 317.
Stomatitis, acute ulcerative: 317.
Tuberculosis: 29, 318.
Venereal diseases: 318.
Yaws: 318.
Employees: 27.
Food supply: 27.
Improvement of grounds: 321.
Microscopic examinations: 313.
Patients: 27, 28.
Pavilion hospital, recommendations for: 323.
Air space: 327.
Buildings: 325.
Material of: 324.
Isolation pavilion: 326.
Lavatories: 326.
Laundry: 326.
Medical pavilion: 325.
Nurses' quarters: 327.
Orientation: 324.
Surgical pavilion: 325.
Ventilation and heating: 324.
Personnel: 319.
Posthouse, erection of: 27, 322.
Receipts: 308, 309.
Stable, construction of: 30.
Subsistence: 320.
Superintendent, work of: 31.
Weather at: 30.
Weather statistics: 323.
Work at: 26–31.

CLAYS:
Analyses of: 446–447.
Deposits of: 404.
CLEMENTS, DR. PAUL C., medical inspector:
Report on sanitary inspection of province of Cavite: 222–231.
Report on special sanitary inspection of province of Misamis: 236–241.
CLOVER, DR. A. M., chief of economic products division, government laboratories:
Mentioned: 423.
Report of: 444–448.
COAL:
Analyses: 446.
Claims, number of: 394.
Deposits of: 38, 40, 41, 393, 394, 402, 403.
COCOANUT INDUSTRY.
Report on: 538–541.
COCOANUT OIL:
Products from: 73.
Use and value of: 540.
COCOANUTS:
Investigation of production: 53, 54, 423, 448.
Use and value of: 538–541.
COFFEE:
Cultivation of: 520.
COFFEE PLANTATION:
Management of: 493, 494.
COFFEE PLANTATION AT LIPA, BATANGAS:
Quality produced: 68.
COOK, DR. GILES B.:
Mentioned: 307.
COPPER:
Analyses of: 446.
Claims, number of: 394.
Deposits of: 38, 399, 400.
COPRA:
Value of: 538–541.
CORN:
Cultivation of: 73, 503, 520.
CORRAL:
Dead-wagon service: 184.
Delivery-wagon service: 184.
Disinfecting service: 184.
Services rendered by: 184.
Transfer of control of: 184.
COTTON:
Cultivation and production of: 493, 536.
COURTS:
Moro Province: 577, 584.
COWS:
Importation of: 61, 62.
CREMATIONS:
Number of: 89, 160.
CRUMB, BURDETTE A., treasurer, district of Sulu, Moro Province:
Mentioned: 572, 594.
CULION, CITY OF:
Location of: 9.
CULION ISLAND:
Construction of buildings: 9.
Leper colony, establishment of: 8, 9.
(See also LEPER COLONY.)
CULION STOCK FARM:
Animals sent to: 65, 488, 489.
Management of: 488, 489.
(See also STOCK FARM.)
CYCLONES OF THE FAR EAST:
Publication of: 543.
DATO ALI. (See MORO PROVINCE.)

Candidates examined and passed: 145, 146.
Report of: 275–276.
Applications examined and passed: 275.
Certificates issued: 275.
Personnel: 275.
Registered dentists, list of: 276.
Receipts: 275.
Undergraduates, number of: 275.
DEVORE, DANIEL B., captain, Twenty-third Infantry, governor, district o Moro Province:
Mentioned: 572, 594.
DISEASES:
Varieties treated at civil sanitarium, Baguio, Benguet—
Beriberi: 313.
Bronchitis: 314.
Dysentery: 314–315.
Indigestion: 315–316.
Influenza: 316.
Malaria: 316.
Meningitis, cerebro-spinal, epidemic: 316–317.
Parasites, intestinal: 317.
Rheumatism: 317.
Skin diseases: 317.
Smallpox: 317.
Stomatitis, acute ulcerative: 317.
Tuberculosis: 318.
Venereal diseases: 318.
Yawns: 318.
DISINTERMENTS:
Number of: 160.
DISPENSARIES:
Prescriptions filled: 159, 179.
Work accomplished by: 177–179.
DUDLEY, DR. F. W., president provincial board of health, Pampanga P
Report of: 241–248.
DUNLEAVY, FRANK J., secretary, district of Cotabato, Moro Province:
Mentioned: 573, 594.
DYER, G. L., commander, U. S. Navy, commandant and naval governor of Guam:
Correspondence relative station on island of Guam: 548, 549.
Instructions for sending weather dispatches: 549–551.
DYSENTERY:
Prevalence of: 93.
EATON, HARRY A., captain, Twenty-third Infantry:

ENGLISH, GEORGE L.:
Mentioned: 386.
EPIDEMICS:
Nonprevalence of: 4.
ESPEJO, SATURNINO, chief vaccinator:
Mentioned: 96.
ESTEROS:
Condition of: 6, 7, 90, 91.
Value of: 91.
ETHNOLOGICAL SURVEY:
Acting chief of, report of: 561–571.
Tribal characteristics: 563–565.
Trip to Surigao: 563.
Chief of survey—
Transfer of: 561.
Visit to St. Louis: 562.
Work of: 77, 81, 561–562.
Exhibit, Louisiana Purchase Exposition—
Arrangements for tribal exhibit: 77, 562.
Tribes represented: 569.
Mamanua, characteristics of: 563.
Mandaya, characteristics of: 563, 564.
Manobo, characteristics of: 563, 564.
Museums—
Commercial—
Building for: 80, 568.
Condition of: 568.
Exhibits: 79, 80, 568.
Ethnological, exhibits for: 79, 80, 567.
Natural history, result of work done: 569.
Publications in course of preparation: 78, 79, 565–567.
Work to be accomplished: 4, 570–571.
EVELAND, A. J., geologist:
Field work of: 38.
Mentioned: 386, 387, 388, 391.
Report on field work in Lepanto-Bontoc: 406–410.
EXECUTIVE ORDERS:
Leper colony, reservation for: 9.
Stock farm, reservation for: 9.
FARMS:
Fodder on: 65.
FERNANDO, ANTONIO, president Provincial Board of Health, Surigao:
Report of: 264–266.
FERRER, Rev. B., S. J.:
Mentioned: 543.
FIBERS:
Collection of: 537.
Cultivation of: 519, 520.
Extracting machines: 537.
Maguey or sisal hemp; growth of: 73, 535.
Paper making from abaca waste: 72.
Plants of importance: 537.
Tree cotton; value of importation into United States: 73.
Seed from, value of: 73.
Value of abaca waste: 73, 532.
FIBER INVESTIGATIONS: 72, 73, 531–538.
Report of fiber expert: 531–538.
Abaca: 532.
Cultivation of: 533.
Extraction of fiber: 534.
Growth of industry: 534.
Irrigation for: 533.
Shade experiments: 533.
Use of: 534.
Waste: 532.
Coir (cocoanut fiber), utilization of: 536.

Maguey: 535.
Cultivation methods: 535.
Extraction of fiber and fiber machinery: 535.
Manila hemp: 532.
Outline of work: 531.
Plants from Hawaii: 535.
Prospects of cultivation: 535.
Publications: 538.
Scientific investigations: 537.
Statistics and information: 537.
Work accomplished: 501–502.
Cotton: 502.
Hemp: 501.
FIBER MACHINERY:
Need of: 520.
FILIPINOS:
Births, number of: 5.
Death rate: 5.
Insanitary habits: 89.
Susceptibility to cholera: 114.
FINLEY, JOHN P., captain, Twenty-seventh Infantry, governor district of Joanga, Moro Province:
Mentioned: 572, 594.
FIREWOOD:
Licenses issued for cutting of: 339, 340.
Quantity taken from public lands: 372.
FISH AND FISHERIES, BUREAU OF:
Organization of: 3.
FITZGERALD, DESMOND:
Mentioned: 75.
FLORES, FATHER FILOMENO, superintendent leper hospital at Cebu:
Report of: 218–219.
FODDER:
Growth on government farms: 65.
FORAGE CROPS:
Cultivation of: 490–492.
Prices of: 490, 491.
FOREST ACT:
Changes made in: 328, 329.
FOREST DISTRICTS. (See FORESTRY BUREAU.)
FOREST MANUAL.
Compilation of: 328.
FOREST MAPS:

FORESTRY—Continued.
Lamao Forest Reserve: 33–34.
Location: 34.
Physical features: 32.
Products: 34.
Soil: 34.
Timber trees, varieties: 34
Licenses granted: 32, 33.
Management: 32.
FORESTRY, BUREAU OF:
Agents, work of: 3, 4.
Division of accounts, work of: 370.
Duties and functions: 36.
Employees: 32.
Employees, salary of: 329–330.
Changes made: 330.
Exhibit at Louisiana Purchase Exposition, preparation of: 329.
Expenditures: 371.
Forest districts, reports on—
Bataan and Zambales—
Clearings: 344.
Fire wardens: 344.
Forest area: 341–343.
Forest stations and administration of same: 344.
General description: 341.
Licenses: 343.
Lumbering: 343.
Tree species: 342–343.
Work to be accomplished: 343.
South Tayabas—
Fire protection: 348.
Forest area: 345–347.
Forest stations: 348.
General description: 345.
Licenses: 347.
Lumbering: 347.
Recommendations: 348.
Tree species: 346–347.
Work to be accomplished: 348.
Forest management, division of, work of: 333.
Forest products, charges collected: 332.
Iloilo Electric Company, lumber operations of: 334.
Inspection division—
Personnel: 330.
Stations, inspection of: 331–332.
Lamao Forest Reserve—
Area: 351.
Botanical garden, letter of botanist concerning: 349–350.
Notes by R. B. Williams: 353–357.
Buildings and improvements: 353–354.
Grounds and location of stations: 353.
Forage plants: 355.
Insects and fungi: 356.
Labor: 356.
Nursery: 354.
Soil analysis: 356.
Tropical fruits: 355.
Tree species: 350.
Work accomplished: 348–357.
Launch for: 330.
Licenses—
Firewood: 339, 340.
Gratuitous: 339, 340.
Issued: 338–340.
Timber cutting: 339, 340.
Logging operations: 335–337.
Machinery: 335–336.

GWYN, M. K., assistant surgeon, quarantine officer, port of Jolo:
Report of: 296–297.
GYPSUM:
Deposits of: 404.
HARBORD, COL. J. G.:
Mentioned: 593.
HAVICE, GEORGE M., superintendent San Ramon farm:
Report of: 514–516.
HAYNE, A. P., secretary, district of Lanao, Moro Province:
Mentioned: 572.
HEALTH, BOARD OF:
Bilibid Prison—
Report of resident physician: 217–218.
Beriberi: 218.
Examinations made: 218.
Pneumonia: 217.
Causes of: 217–218.
Recommendations to prevent: 218.
Prisoners, number of: 217.
Smallpox: 217.
Visits for treatment of diseases: 217.
Cashier, report of: 202–204.
Animals inspected and receipts: 203.
Miscellaneous receipts: 204.
Permits issued and receipts: 203.
Vaccine virus issued and receipts: 204.
Cebu leper hospital—
Report of superintendent—
Diseases among lepers: 218.
Inspections: 218–219.
Patients, number of: 218.
Chinese hospital for contagious diseases—
Report of medical superintendent of: 216–217.
Cholera hospital: 217.
Maintenance: 217.
Plague hospital: 216–217.
Smallpox hospital: 217.
Staff: 217.
Commissioner of, recommendations of: 150, 151.
Disbursements: 202.
Disbursing officer, report of: 202.
Duties of: 12–14.
Duties and powers of: 83.
Efficiency of: 84.
Financial resources, result of: 84.
Health inspector, chief, report of: 170–188.
Infants, precautions taken for care of: 6.
Palestina leper hospital—
Report of: 219.
Patients, number of: 219.
Condition of: 219.
Provincial—
Instructions to presidents of: 135–136.
Schools of instructions for presidents: 136.
Publications: 187.
Public sanitation, progress made in: 84.
Receipts: 149.
Resolution declaring freedom from cholera: 132.
River and harbor work: 176.
Sanitary engineer, report of: 196–202.
Sanitary inspections—
Report on inspection of city of—
Cebu: 231–236.
Bubonic plague: 236.
Death and birth certificates: 233.
Escolta district: 234, 235.
Hospitals: 234.

HEALTH, BOARD OF—Continued.
Sanitary inspections—Continued
Report on inspection of city of—Continued.
Cebu—Continued.
Leper hospitals: 232.
Buildings: 232.
Guards: 232.
Patients: 232.
Licenses: 234.
Markets: 234.
Municipal board of health: 232.
Prostitution: 233.
Rinderpest: 236.
Street cleaning: 233.
Report on inspection of province of—
Albay: 219.
Bataan: 219–222.
Cholera epidemics: 221–222.
Customs and habits of people: 222.
Municipal boards of health: 220–221.
Provincial board of health: 219.
Benguet: 256–259.
Benguet road: 257.
Cholera, death rate: 256.
Diseases among domestic animals: 257.
Smallpox epidemic: 257.
Cavite: 222–231.
Animal disease: 231.
Mortality statistics: 224–231.
Beriberi: 230.
Death rate: 225.
Dysentery: 230.
Fevers: 226–227.
Gastro-enteritis: 228.
Infantile convulsions: 226.
Smallpox: 227.
Tuberculosis: 229.
Municipal boards of health: 222–224.
Provincial board of health: 222.
Sanitary condition of towns: 231.
Leyte: 261–264.
Cholera epidemic: 263.
Hospital sites: 264.
Hygiene and sanitary condition of towns: 261.
Provincial board of health: 261.
Work accomplished: 261.
Misamis: 236–241.
Customs and habits of people: 239.
Death rate: 240.
Epidemics: 240, 241.
Cholera: 240.
Smallpox: 240.
Hospital sites: 241.
Hygiene and sanitary condition of towns: 239.
Municipal boards of health: 237–238.
Nominations for presidents: 238–239.
Provincial board of health: 236.
Pampanga: 241–248.
Births and deaths: 247, 249.
Cholera, deaths from: 244, 249.
Customs and habits of people: 258.
Diseases of animals and poultry: 248.
Hospitals, proposed: 258.
Insanity: 246.
Leprosy: 246.
Municipal boards of health: 241–242, 248.
Salaries of presidents: 242.

HEALTH, BOARD OF—Continued.
Sanitary inspections—Continued.
Report on inspection of province of—Continued.
Pampanga—Continued.
Recommendations: 241–245.
Smallpox: 245.
Vaccinations: 245, 246.
Vaccine virus received: 245.
Pangasinan: 251–254.
Cholera, deaths from: 254, 255.
Customs and habits of people: 258.
Disease among animals: 258.
Diseases: 254.
Municipal boards of health: 251–254.
Samar: 260–261.
Disposition of slops, garbage, and excreta: 261.
Hospital sites: 264.
Hygiene and sanitary condition of towns: 260.
Municipalities: 261.
Provincial board of health: 260.
Smallpox: 263.
Work accomplished: 260.
Surigao: 261–266.
Cholera, history of epidemic: 263–266.
Customs and habits of the people: 264.
Death rate: 262.
Cause: 262.
Diseases among domestic animals: 262.
Diseases, common: 262.
Hospital sites: 264.
Hygiene and sanitary condition of towns: 262.
Municipal boards of health: 262.
Provincial board of health: 261.
Smallpox: 263, 266.
Work accomplished: 262.
Tarlac: 249–251.
Municipalities: 249, 250.
Cholera: 250, 251.
Introduction: 250.
Measures adopted: 250.
Number of cases: 251.
Union, La: 255–256.
Cholera: 256.
Diseases among animals: 258.
Diseases, deaths from: 256.
Municipalities: 255.
Smallpox, deaths from: 256.
Zambales: 266–269.
Cholera epidemic: 269.
Customs and habits of people: 269.
Municipal boards of health: 267–269.
Provincial board of health: 266.
San Lazaro Hospital, report of physician in charge of: 188–195.
Statistical tables—
Birth rate: 158.
Births reported: 158.
Burials: 160.
Cholera, Manila: 167–169.
Age: 168.
Districts: 167.
Nationality: 167.
Cholera in provinces: 168, 169.
Comparative mortality: 153.
Cremations: 160.
Deaths, by age: 152.
Deaths, by districts: 152.

HEALTH, BOARD OF—Continued.
Sanitary inspections—Continued.
Deaths, by race: 151.
Deaths, classified report of, by sexes: 152.
Death rate per thousand, by race: 152.
Deaths among transients, with cause: 153–155.
Deaths occurring in Bilibid prison: 158.
Disinfections: 162.
Disinterments: 160.
Insane persons living in various provinces: 167.
Inspection of houses, premises, and vaults: 161, 162.
Lepers living in various provinces: 166.
Mortuary report: 155–158.
Pails cleaned: 161.
Plague: 166.
Population of Manila: 151.
Prescriptions filled at municipal dispensaries: 159.
Sick and wounded, city poor attended by municipal physician: 159.
Smallpox: 165.
Ages: 165.
Districts: 165.
Nationality: 165.
Vaccinations, city of Manila: 164.
Vaccine virus distributed by board of health: 162, 163, 164.
Vaults cleaned: 161.
Veterinary division—
Animals inspected: 170.
Condemned and cremated: 170.
Slaughtered: 169.
Veterinary division—
Report of chief of: 204–207.
Animals treated: 205.
Inspected: 150, 206.
Condemned: 206.
Slaughtered and condemned in Matadero: 207.
Inoculations against rinderpest: 207.
Duties of: 204, 205.
Organization: 204.
Personal: 205.
Work of: 150, 151.
(See also VETERINARIAN.)
Work of: 12–14.
HEALTH INSPECTOR, chief, Philippine Islands:
Report of: 170–188.
HEALTH FORMS:
Provincial: 187.
HEALTH, PUBLIC, BUREAU OF:
Commissioner of, report of: 83–269.
Confliction of authorities: 84.
Organization of: 132.
HECTARE:
Equivalent in acres: 371.
HEIL, JOHN, in charge Agricultural College and Experiment Station:
Report of: 516–521.
HEISER, VICTOR G., passed assistant surgeon, chief quarantine officer for Philippine Islands:
Report of: 277–301.
HEMP:
Cultivation of: 533.
Extraction of fiber: 534.
Growth of industry: 534.
Irrigation for: 533.
Shade experiments: 533.
Use of: 534.
Waste: 532.
(See also FIBER INVESTIGATIONS and AGRICULTURE, EXPERIMENT STATIONS.)

HENDERSON, THOMAS R., secretary, district of Davao, Moro Province:
Mentioned: 573, 594.
HERBARIUM:
Specimens for: 461, 462.
HERZOG, DR. MAXIMILIAN, pathologist:
Mentioned: 51, 420.
HIESER, DR. VICTOR G.:
Mentioned: 22.
HOGS. (See CATTLE.)
HOG CHOLERA. (See SWINE PLAGUE AND HOG CHOLERA.)
HOMESTEAD ENTRIES:
Number of: 468.
HOMESTEAD LAW:
Moro Province: 589.
HONEY:
Quantity taken from public lands: 372.
HORSES:
Breeding of: 63.
Breeding station for: 63, 64.
Importation of: 63, 484, 485.
Disposition of: 63, 64, 484, 485.
HOSPICIO DE SAN JOSÉ:
Sanitary condition of: 186.
HOSPITALS:
Reports on—
Cebu Leper Hospital: 218–219.
Chinese Hospital for Contagious Diseases: 216–217.
Civil Hospital: 19–26, 302–307.
Civil Sanitarium: 27–30, 309–327.
General Hospital: 18, 143, 144.
Hospicio de San José: 186.
Insane Hospital: 17, 143.
Moro Province: 593.
Palestine Leper Hospital: 219.
San Lazaro Hospital, 18, 144, 183, 188–195.
(See also MANILA, CITY OF.)
HOWELL, EDWIN E.:
Mentioned: 386.
ICKIS, H. M.:
Mentioned: 387, 388, 391.
ILOILO ELECTRIC COMPANY:
License granted to: 337.
Logging operations: 335–337.
Lumber operations of: 334.
Mill erected by: 334, 335.
ILOILO, PORT OF:
Report of quarantine transactions: 291–294.
INDIA RUBBER:
Quantity taken from public lands: 372.
INFANTS:
Mortality of: 5, 6, 85, 88.
Cause of: 6, 88.
Precautions taken by board of health: 6, 88.
INSANE PERSONS:
Number of: 167.
INTERIOR, DEPARTMENT OF:
Operations of: 3, 4.
Organization of: 3.
Secretary, report of: 3–81.
IRON:
Claims, number of: 394.
Deposits of: 40, 392, 401–402.
JENKS, DR. ALBERT E.:
Ethnological investigations of: 77, 78, 565.
JOBLING, DR. JAMES W.:
Mentioned: 48, 415.

ities, Government—Continued.
ıu of—Continued.
Chemical laboratory—Continued.
Investigation of cocoanut production: 53, 54, 423, 448.
Mineral analyses: 52, 422.
Work of: 52, 53, 421–425.
Chemical work, assistants: 45, 46.
Clinical work: 55, 56.
Cattle: 56.
Autopsies: 56.
Plague work: 56.
Equipment: 44, 45.
Financial statement: 297–301.
Appropriations: 297, 301.
Disbursements: 298–301.
Librarian, report of: 426–435.
Bulletins mailed: 432–433.
Care of books: 427.
Growth of library: 426, 427.
List of current periodicals on file: 427–431.
List of persons and institutes making donations: 433–435.
List of publications ordered: 431, 432.
Library, equipment of: 46, 47.
Books and periodicals: 47.
Photographer, work of: 56.
Report of: 465.
Publications, list of: 55.
Scientists, work of: 45.
Sera and prophylactics, preparation of: 57.
Serum laboratory: 48–50, 411–426, 449–461.
Animals purchased and sold: 450.
Animals, small, breeding of: 49, 418, 449.
Antiplague serum, preparation and use of: 49, 416, 449, 454, 459.
Antirinderpest serum, preparation and use of: 416, 450–453, 457, 458, 466.
Animals inoculated: 451–453.
Director, work of: 48, 449.
Employees, difficulty in securing: 49.
Equipment, changes in: 49.
Mallein, production of: 455.
Rinderpest, treatment of: 48, 49, 449.
Research work, lack of opportunity for: 49.
Surra among carabaos, observations and treatment of: 48, 416, 417, 451, 455, 458–459.
Texas fever investigations: 456.
Vaccine virus, preparation of: 49, 416, 453, 459.
Animals used: 454, 460.
Amount prepared and distribution of: 454, 460, 466.
Superintendent, office of: 47, 414.
Report of: 411–426.
Library: 415.
Maintenance of: 411–412.
Personnel, increase of: 413.
Work of bureaus, value of: 57.
Amao Forest Reserve:
Area: 351.
Botanical garden, letter of botanist concerning: 349–350.
Location: 34.
Notes by R. B. Williams: 353–357.
Buildings and improvements: 353–354.
Grounds and location of stations: 353.
Forage plants: 355.
Insects and fungi: 356.
Labor: 356.
Nursery: 354.
Soil analysis: 356.
Tropical fruits: 355.

AO FOREST RESERVE—Continued.
Physical features: 32.
Products: 34.
Soil: 34.
Timber trees, varieties: 34.
Tree species: 350.
Work accomplished: 348–357.
AMSON-SCRIBNER, F., chief, bureau of agriculture:
Resignation of: 60.
ANDS, PUBLIC:
Friar lands, administration and leasing of: 477.
Homestead entries, number of applications for: 468.
Legislation concerning: 58.
Mining claims—
Applications received: 469.
Laws relating to: 469.
Locations, number of: 470.
Recording of: 470.
Quantity of forest products taken from: 372, 373.
San Lazaro estate—
Fire on: 476.
Improvement and extension of streets: 475–477.
Rents received: 476.
Suits relative to: 476–477.
Spanish land titles—
Records of: 475.
Fees for: 475.
Surveys, system of: 59, 470–475.
Report and recommendations of committee on subject of: 471–475.
LANDS, PUBLIC, BUREAU OF:
Appropriations and expenditures for: 479.
Chief of, work of: 58, 60.
Friar lands, administration of: 60.
Increase estimates in appropriations for: 478.
Increase in office force necessary: 478.
Report of chief of: 468–479.
Spanish mining grants, transfer of administration of: 59.
LANGHORNE, GEORGE T., captain, Eleventh Cavarly, secretary Moro Province:
Appointment: 572, 594.
Report on trip to Sarawak, Java, and the Federated Malay States: 671–701.
Report on the military and police service of Sarawak, Java, and the Federated Malay States: 695–701.

LAUNDRIES:
Need of: 6, 90.

LEAD:
Claims, number of: 394.
Deposits of: 400, 401.
LEPANTO-BONTOC, PROVINCE OF:
Mining, report on field work: 406–410.

LEPERS:
Act for segregation, treatment, and care of: 94, 146.
Census of: 8, 94.
Colonization of: 9, 94.
Number living in provinces: 166.
Number of: 94.
Type: 94.
LEPER COLONY:
Appropriation for: 8.
Establishment of, on Cullon Island: 8, 9, 94, 95.
Government reservation for, establishment of: 9, 94.
Laborers for: 9.
[illegible] appointment of: 95.
[illegible] HOSPITAL)

DR. GILBERT N.:
ntioned: 54.
WILLIAM F., assistant surgeon:
ntioned: 22.
PROVINCE OF:
nitary inspections, report of: 261–264.
Cholera, epidemic: 263.
Hospital sites: 264.
Hygiene and sanitary condition of towns: 261.
Provincial board of health: 261.
Work accomplished: 261.
NSES:
Companies to whom issued: 340.
Firewood: 339, 340.
Forest products: 338–340.
Forestry: 32, 33.
Gratuitous: 339, 340.
Timber cutting: 339, 340.
NDLEY, DR. C. A.:
Mentioned: 110.
IMESTONES:
Analyses of: 447.
Deposits of: 404.
IVE STOCK:
Importation of: 481, 484, 485.
LOCUSTS:
Destruction of: 150.
LOGGING:
Machinery installed: 335–336.
Operations: 335–337.
LUMBER:
Operations of Iloilo Electric Company: 334.
Prices of: 374–378.
LUMBER INDUSTRY:
Moro Province: 588.
LUMBER MILLS:
Operation of: 334, 335.
LYON, WILLIAM S., in charge, division of plant industry:
Report of: 531–538.
McCASKEY, H. D., chief mining bureau:
Mentioned: 35.
Report of: 379–410.
McCOY, GEORGE W., assistant surgeon, quarantine officer, port of Iloilo:
Report of: 291–294.
McGHEE, CHARLES B., treasurer, district of Zamboanga, Moro Province:
Mentioned: 572, 594.
McMULLEN, R. H., D. V. S., veterinarian, board of health:
Preliminary report on presence of Anthrax in Philippine Islands: 207–210.
MAGUEY:
Extraction of fiber and fiber machinery: 535.
Cultivation methods: 535.
Plants from Hawaii: 535.
Prospects of cultivation: 535.
(*See also* FIBER INVESTIGATIONS.)
MALARIAL INFECTION:
Prevalence of: 93.
MALLEIN:
Production of: 455.
MALLORY, DR. WILLIAM J.:
Mentioned: 307.
MAMANUA:
Characteristics of: 563.
MANDAYA:
Characteristics of: 563, 564.
MANGANESE:
Deposits of: 401.

MANILA, CITY OF:
Autopsies, number of: 89.
Bath houses, need of: 6, 90.
Beriberi, prevalence of: 93, 94.
Births, number of: 5, 85.
Nationalities of: 86.
Bubonic pleague—
Deaths from: 5.
Number of cases: 11.
Buildings, overcrowding, effects of: 139.
Burials and disinterments, number of: 89.
Cholera—
Cases, number of: 11, 114, 115, 131.
Deaths from, number of: 5, 114, 115, 131.
Cremations, number of: 89.
Dairy farm, establishment of: 61.
Deaths—
Number of: 5, 86, 87.
Medical attendance, lack of: 6.
Nationality of: 86.
Rate of, by districts: 86.
Without medical attendance: 87, 88.
Detention camp: 116.
Disinfectors, division of, organization of: 15, 16, 138.
Dispensaries and free clinics—
Establishment of: 16, 17.
Prescriptions compounded: 142.
Number of people treated: 17.
Districts, health of: 6.
Dysentery—
Prevalence of: 93.
Precautions against: 93.
Deaths from: 93.
Esteros—
Condition of: 6, 7, 90, 91.
Value of: 91.
Foods and drinks, inspections of: 16, 140, 141.
Free clinics, establishment of: 143.
Garbage and refuse, collection and disposal of: 137.
Habitations—
Type and condition of: 138, 139.
Overcrowding of: 139.
Health, board of—
Duties of: 12–14.
Work of: 12–14.
(See HEALTH, BOARD OF.)
Health districts—
Prescriptions filled: 179.
Vaccinations by: 174.
Health stations—
Cases detected and disposed of: 172.
Sanitary work accomplished by: 171.
Vaccinations by: 174.
Hospitals—
General—
Needs of: 17, 18, 143, 144.
Plans for: 18, 144.
Site for: 18, 144.
Insane, establishment of: 17, 143.
Maternal, need of: 6.
Patients treated: 19.
San Juan de Dios, work of: 18, 19, 144.
San Lazaro, treatment in: 18, 144.
(*See also* HOSPITALS.)
Infants—
Mortality of: 5, 6, 85, 88.
Cause of: 6, 88.
Methods adopted to remedy: 6, 88.

.. CITY OF—Continued.
undries, need of: 6, 90.
w lands—
Condition of: 91.
Filling in of: 7.
Ordinances governing: 91, 92.
Malarial infection, prevalence of: 93.
Markets—
Condition of: 16, 140.
Medical attendance, lack of: 6.
Midwives, municipal, duties of: 19, 145.
Morgue—
Autopsies: 6, 89.
Burials: 6, 89.
Cremations: 89.
Mosquitoes—
Breeding places: 92.
Varieties of: 92.
Opium-smoking establishments, number and condition of: 16, 142.
Ordinances, low lands, regulations for: 91, 92.
Pail conservancy system, work of: 137, 138, 161.
Physicians, municipal—
Duties of: 19, 145.
Names and assignment: 177.
Work of: 159, 176, 177.
Population: 151.
River and harbor population, number of: 139, 140.
Sacred spring—
Cause of death from cholera: 5.
Guard over: 5.
Sanitary condition of—
Food and drink, inspections of: 140, 141.
Garbage and refuse, collection and disposal of: 137.
General conditions: 136.
Inspections, number of: 132.
Habitations, type and condition of: 138, 139.
Overcrowding of: 139.
Markets and tiendas: 140.
Condition of: 140.
Offensive occupations: 141.
Opium-smoking establishments: 142.
Overcrowding of buildings: 16.
Rats caught: 171.
River and harbor population: 139, 140.
Rules regulating: 12–14.
Street cleaning: 136.
Work accomplished by health stations: 171.
Sanitary engineering, division of, abolished: 14, 133.
Sanitary inspections: 13, 14.
Smallpox, number of cases: 10.
Deaths: 5, 10.
Streets, cleaning of: 136.
Tiendas, number of: 16.
Vaccinations, number of: 10, 95, 96.
Vital statistics: 5, 6.
Difficulty in getting returns: 5.
Water supply—
Analyses of: 437–438, 444, 447.
Protection against cholera: 116.

MANOBO:
Characteristics of: 563, 564.

MAPS:
Forest tracts: 32.
Mineral map: 43.
MARCAIDA, J. MA. DE, agricultural expert:
Report on distribution of seed: 509–510.
MARKETS. (See MANILA, CITY OF.)

RAL RESOURCES—Continued.
Collection of information concerning—Continued.
Salt: 404.
Silver: 401.
Sulphur: 403.
Tin: 401.
Zinc: 401.

NING:
Status of work: 39–42.
NING BUREAU:
Assay work transferred: 36, 382.
Claims located: 41.
Claims, number of: 394.
Correspondence: 384, 385.
Employees, trips taken by: 4.
Examinations and reports made by: 381.
Expeditions: 389–391.
Field work: 38, 39, 386–392.
Field work in Lepanto-Bontoc: 406–410.
Financial statement: 406.
Functions of: 379.
Labor, development of: 395, 396.
Legislation, status of: 396, 397.
Library, condition of: 385.
Mineral collections: 37, 38.
Mining code, compilation of: 383.
Mining developments, status of: 392–397.
Mining grants, transfer of administration of: 36, 382, 383.
Mining law, acts pertaining to: 384.
Museum, collections for: 386, 387.
Office work: 384.
Organization: 35–36, 380, 381.
Quarries: 394–395.
Employees: 395.
Work accomplished: 395.
Quarters needed: 37, 383.
Recommendations: 406.
Reorganization of: 3.
Report of: 379–409.
Taal Volcano, result of visits to: 391.
Transportation, problem of: 396.
Visits to Taal volcano: 391.
Work of, outline of: 379–381.
MINING CLAIMS:
Laws, amendment to, urged: 42, 43.
Drawbacks to operations: 42, 43.
Applications received: 469.
Laws relating to: 469.
Locations, number of: 470.
Recording of: 470.
MINING CODE:
Compilation of: 383.
MINING GRANTS:
Administration of, transferred: 382, 383.
MINING LABOR:
Efficiency of: 42.
MINING LAW:
Acts pertaining to: 384.
MISAMIS, PROVINCE OF:
Sanitary inspections, report of: 236–241.
Customs and habits of people: 239.
Death rate: 240.
Epidemics: 240, 241.
Cholera: 240.
Smallpox: 240.
Hospital sites: 241.
Hygiene and sanitary condition of towns: 230.

) PROVINCE—Continued.
Acts, legislative council—Continued.
Harbor lines, establishment of: 670.
Helm, Frank, reward for arrest and conviction of murderers of: 613.
Iligan-Lake Lanao road, appropriation for improvement of: 660.
Intoxicating liquors, regulating sale of: 604–606.
Jolo. (See SULU DISTRICT.)
Lanao district:
Cedula tax, extension of time for payment of: 607.
Organization of office of governor: 601.
Salary of secretary and employees: 601.
Salary and wages, appropriations for: 597, 603, 612, 652, 663.
Treasurer, organization of the office of: 608.
Land taxes, levy, assessment, and collection of: 640–648.
Markets, Zamboanga, appropriation for: 659.
Midel, Isidoro, appropriation for: 613.
Municipalities, establishment of: 598.
Municipalities, government and organization of: 638, 639, 667.
Municipal code: 613–632.
Amendment to: 653.
Elections: 614–618.
Elector's oath: 615.
Qualifications of electors: 614–618.
Municipal council: 623–626.
Officers, qualifications and duties: 618–623.
Provisional and final sections: 631–632.
Taxes and finance: 626–631.
Non-Christian tribes, government for: 633–638.
Markets for, appropriations for: 659.
Paragas, Lorenzo, appropriation for: 613.
Pearl fisheries, protection of: 648.
Provincial engineer, office of, clerk hire: 600.
Public laws, translation of, employees for: 640.
Public works, employment of enlisted men, United States Army: 660.
Public works and permanent improvements, appropriations for: 665.
Registrar of property, employment of clerk: 670.
Roads, appropriation for: 633.
Schools—
Employees for: 609.
Employment of teacher: 670.
Shells of marine mollusca, fishing for, regulations for: 654–657.
Skilled laborers on public works, employment of enlisted men, United States Army: 660.
Sulu district—
Jolo, appropriation for expenses of: 607, 633, 654.
Appropriation for bridges: 658.
Salary and wages, appropriations for: 596, 603, 611, 650, 663.
Public works and permanent improvements, appropriation for: 665–666.
Treasurer, organization of the office of: 608.
Taxes, levy, assessment, and collection of: 640–648.
Tax lists, Zamboanga, clerk hire for preparation of: 659.
Timber cutting, disposition of collections from: 607.
Translation of public laws, employees for: 640.
Treasurer, office of, clerk hire: 667.
Zamboanga district—
Jail, appropriation for: 633.
Markets, appropriations for: 659.
Public works and permanent improvements, appropriations for: 665, 666.
Salary and wages and miscellaneous expenses, appropriations for: 596, 602, 610, 650, 662, 667.
Wharf, repair and construction of, appropriations for: 653, 661.
Tax list, clerk hire for preparation of: 659.
Agricultural conditions: 588, 589.
American influences: 590.
Attitude of American Government: 574, 575.

Moro Province—Continued.
Barracks and quarters, construction of: 591.
Bates treaty, attitude of people under: 574.
Boats, registration of, cost of: 591.
Cedula taxes, payment of: 581.
Disposition of: 581.
Citizenship, American, recommended: 592.
Climatic conditions: 590.
Commerce: 580.
Conditions at time of American occupation: 573, 574, 576.
Constabulary, efficiency of: 593.
Cotabato, condition of affairs in: 587.
Courts, organization of: 577.
Jurisdiction: 584.
Dato Ali—
Arms and ammunition captured: 578.
Followers of: 578.
Operations against: 577, 578.
Davao district—
Condition of affairs in: 587.
District officials: 572.
Districts, organizations: 572, 574, 575.
Engineer, appointment: 572.
Expenditures: 579, 580.
Forage, cultivation of: 591.
Forest products: 588.
Governor, report of: 572–701.
Recommendations relative to—
Barracks and quarters, construction of: 591.
Boats, registration, cost of: 591.
Citizenship, American: 592.
Forage, cultivation of: 591.
Labor conditions: 593.
San Ramon Farm, transfer of control of: 592.
Steamships, subsidizing of: 593.
Territorial changes: 591, 592.
Tobacco, reduction of duty: 591.
Government, establishment of: 573.
Difficulties of: 573.
Homestead law: 589.
Hospital, need of: 593.
Justice, administration of: 584–585.
Antislavery law, effects of: 585.
Courts, jurisdiction of: 584.
Labor conditions: 593.
Lanao district, condition of affairs in: 588.
Laws, changes recommended: 577, 579.
Enforcement of: 578, 579.
Legislative council, meeting: 572.
Lumber industry: 588.
Mohammedanism: 577.
Moros—
Morality: 576.
Outrages committed by: 573, 574.
Religious and moral conditions: 577.
Opium smuggling: 590.
Organization: 572.
Outrages committed: 573, 574.
Peace and order prevailing: 577, 578.
People, classes of: 573.
(See also Moros.)
Piracy: 576.
Political situation: 576.
Public works: 583–584.
Buildings: 584.
Epidemics, cattle diseases, effects of: 584.
Roads and trails, construction of: 583, 584.

MORO PROVINCE—Continued.
Railroad, Overton to Marahui: 593.
Estimated cost: 593.
Revenues: 579, 581.
San Ramon farm, control of, transfer recommended: 592.
Schools, appointment provincial superintendent: 572.
School system: 581–583.
Buildings: 582.
Enrollment: 582.
Language: 582.
Teachers, salaries: 581.
Teaching methods: 582, 583.
Secretary—
Appointment: 572.
Report on trip to Sarawak, Java, and the Federated Malay States: 671–701.
Report on military and police service: 695–701.
Slaves, rights of: 575, 585.
Slave trading, condition of: 575.
Slavery, effects of: 575.
Law effecting: 585.
Steamships, subsidizing: 593.
Sulu district, condition of affairs in: 586, 587.
Territorial changes recommended: 591, 592.
Tobacco, duty recommended: 591.
Transportation facilities: 589, 590.
Treasurer, appointment: 572.
Tribal wards—
Government for: 575.
Organization of: 575.
Villages, establishment of: 578.
Zamboanga district, condition of affairs in: 586.
MOSQUITOES:
Breeding places: 7, 92.
Danger of yellow-fever infection: 7, 92.
Extermination of: 176.
Habitat of: 7, 92.
Varieties of: 92.
MOULDEN, DR. WILLIAM R., resident physician Bilibid Penitentiary:
Special report of: 217–218.
MUNSON, ED. L., captain and assistant surgeon, U. S. A.:
Mentioned: 91, 96.
Plans for vaccination: 10.
Resignation of: 21.
MUSEUMS:
Need of building: 80.
Ethnological and commercial: 79, 80.
MYERS, MURRAY J., D. V. M.:
Special report on swine plague and hog cholera: 210–212.
Special report on Texas fever (tick fever, Spanish fever) 212–215.
NABALOI, DIALECT OF BENGUET:
Notes on, publication of: 79, 566.
NEWBERNE, R. E. L., secretary-treasurer, board of medical examiners:
Report of: 270–273.
NIGHT SOIL:
Collection and disposal of: 15.
NURSES:
Filipino, training of: 26, 145.
Trained, employment of: 183.
OPIUM SMOKING ESTABLISHMENTS:
Number and condition of: 16.
ORDINANCES. (See MANILA, CITY OF.)
OSCAR, CHARLES J., captain, Seventeenth Infantry, district of Sulu, Moro Province:
Mentioned: 572, 594.
OSGOOD, H. D., sanitary engineer:
Report of: 196–202.

NUM:
eposits of: 38, 401.
DR. ARLINGTON, medical inspector:
pecial report on sanitary work in the city of Cebu: 231–236.
DUS STONES:
arieties found: 43, 405.
OR, JOHN R., JR., captain, Seventeenth Infantry, secretary district of
lboanga, Moro Province:
lentioned: 572, 594.
ITUTES:
umber of: 182.
xaminations, number of: 182.
anitary supervision of: 182.
CATIONS:
griculture, bureau of: 504.
otanist: 464.
overnment laboratories: 55.
ealth, bureau of: 187.
ANTINE SERVICE:
eport of the chief quarantine officer: 277–301.
Cebu quarantine station, appropriation for: 23, 24, 285.
Location of: 285.
Report of transactions: 294, 295.
Cholera, cases reported: 280.
Cause of: 282.
Epidemic, outbreak of: 281–282.
Precautions against outbreak: 117, 281.
Difficulties encountered: 277–278.
Disbursements: 288.
Iloilo, port of, report of quarantine transactions: 291–294.
Immigrant medical inspection: 286.
Number of immigrants inspected: 286.
Result of: 286, 287.
Interisland quarantine inspections: 24, 285–286.
Jolo, port of, report of quarantine transactions: 296–297.
Launch, appropriation for: 24, 285.
Leprosy detected on vessels: 23, 284.
Personnel: 278.
Physical examinations made: 23, 284, 285.
Plague: 282–283.
Cases reported: 282.
Fumigation: 283.
Measures against infection: 283.
Vessels disinfected against: 23.
Smallpox and vaccination: 284.
Circular letter relative to precaution necessary: 287, 288.
Vaccinations, number of: 23, 284.
Certificates of: 284.
Result of: 284.
Vessels disinfected: 23.
Vessels boarded, number of: 22, 279.
Disinfected, number of: 22, 23, 279, 285.
Fumigated, number of: 279, 280.
Method used: 280.
Vessels:
Regulations relative to passengers, crew, and cargo: 288–289.
Statistics of quarantine transactions: 290–301.
Work of: 21.
Result of: 180.
IES:
evelopment of: 394–395.
mployees: 395.
peration of: 42.
ock, cost of: 42.
ork accomplished: 395.

RAILROADS:
Moro Province, estimated cost: 593.
RATS:
Disappearance of: 12.
Number caught during year: 171.
RATTAN:
Quantity taken from public lands: 372.
REDMAYNE, ROBERT CLIFT:
Mentioned: 385.
REICHMANN, CARL, captain, Seventeenth Infantry, governor district of Cotabato, Moro Province:
Mentioned: 573, 594.
RESIN:
Quantity taken from public lands: 372.
RICE:
Transplanting of: 495.
Time for: 495.
Work, how accomplished: 495, 496.
(See also AGRICULTURE, EXPERIMENT STATIONS.)
RICE FARM, MURCIA, TARLAC:
Acreage: 495.
Acreage under cultivation: 69.
Buildings: 69.
Crops, condition of: 495.
Draft animals: 69.
Japanese rice, cultivation of: 69.
Labor, efficiency and price of: 69, 496, 497.
Machinery: 70.
Panay, report on thrashing of: 513–514.
Rice, methods of planting: 69.
Rice, thrashing of: 69, 70.
Situation of: 495.
Soil conditions: 69, 495.
Steam plow, use of: 497, 498.
Steam thrasher, work accomplished: 69.
Report of superintendent: 511–513.
Crops: 511.
Employees: 511.
Horses received: 511, 512.
Irrigation: 511.
Labor: 513.
Rice cultivation: 511, 512.
RICHMOND, DR. SHANNON:
Mentioned: 120.
RINDERPEST:
Difficulties in combating: 21.
Inoculations against: 207.
Prevalence of: 4.
Serum for, preparation and use of: 416, 450–453, 457, 458, 466.
Treatment of: 48, 49, 449.
Work against: 20, 21.
ROBINSON, H. J.:
Mentioned: 392.
ROLL:
Equivalent in pounds: 378.
SACRED SPRING:
Drinking from, cause of cholera: 5.
SALEEBY, NAJEEB M., provincial superintendent of schools, Moro Province:
Appointment: 572, 594.
SALT:
Deposits of: 404.
SAMAR, PROVINCE:
Sanitary inspections, report of: 260–261.
Disposition of slops, garbage, and excreta: 261.
Hospital sites: 264.
Hygiene and sanitary condition of towns: 260.
Municipalities: 261.

SAMAR, PROVINCE—Continued.
Sanitary inspection, report of—Continued.
Provincial board of health: 260.
Smallpox: 263.
Work accomplished: 260.
SANCHEZ, A. M., soil physicist:
Report of: 521–531.
SANGER, J. P., major-general, U. S. A., director Philippine census:
Correspondence with director of Philippine weather bureau: 557–558.
SANITARY ENGINEER:
Report of: 196–202.
Houses condemned: 199–202.
Personnel: 198.
Work accomplished: 197–199.
SANITARY INSPECTORS:
Assistants, number of: 186.
Detail of: 185.
Number of: 185.
SANITARY POLICE:
Assignment as inspectors: 186.
SANITARY SCHOOL:
Instructions for presidents of provincial boards of health: 186, 187.
SANITATION:
Conditions in provinces: 133–134.
Habits of Filipinos: 89.
Inspection of places of business: 182.
Inspections of provinces: 133.
Laws, enforcement of: 19, 20, 146, 147.
Prostitution, supervision over: 182.
Provincial organization: 133–134.
Instructions to provincial presidents of boards of health: 135–136.
School of instruction: 136.
Schools, inspection of: 181.
Work in provinces: 14, 15.
(See also MANILA, CITY OF.)
SAN JUAN DE DIOS HOSPITAL:
Sanitary condition of: 186.
Work of: 18, 19, 144.
SAN LAZARO HOSPITAL:
Cases received and died: 183.
Leper department: 183.
Woman's department: 183.
Cholera department: 183.
Plague department: 183.
Smallpox department: 183.
Morgue, crematory, and disinfecting plant, cases treated: 183, 184.
Opening of new infectious wards: 182.
Nurses for: 183.
Physician in charge, report of: 188–195.
Buildings, cost of: 188.
Cases treated: 189–192.
Contagious diseases treated: 193.
Bubonic plague: 193, 194.
Cholera: 195.
Smallpox: 194.
Control of: 189.
History: 188.
Improvements and additions: 189.
Leper department:
Discharged and escaped: 193.
Number of cases: 193.
Morgue and crematory, bodies received and cause of death: 195.
Organization: 188, 189.
Origin: 188.
Woman's department, work done in: 190–192.
Sanitary condition of: 186.
Storehouse, removal of: 185.

SAN LAZARO HOSPITAL—Continued.
Treatment in: 18, 144.
Receipts; 149.
SAN LAZARO ESTATE:
Fire on: 60, 476.
Improvement and extension of streets: 475–477.
Rents received: 60, 476.
Street system, improvement of: 59, 60.
Suits relative to: 60, 476–477.
SAN RAMON FARM, MINDANAO:
Acreage of: 70, 498.
Cocoanut plants, cultivation and sale of: 71, 72, 499.
Condition of: 70.
Cultivation of:
Cocoanuts: 70, 71.
Copra: 70.
Hemp: 70, 71, 499.
Difficulties experienced in transportation and labor: 71.
Disposition of property, recommendations: 71.
Irrigation: 499.
Land available for cultivation: 498.
Recommendations of General Wood: 71, 72.
Report of superintendent: 514-516.
Cultivation of:
Alfalfa: 515.
Cacao: 515.
Cocoanuts: 514.
Hemp: 515.
Vegetables: 515.
Expenses: 516.
Rainfall: 515.
Transfer of control of, recommended: 592.
SARAWAK, JAVA, AND THE FEDERATED MALAY STATES:
Report of George T. Langhorne, captain, Eleventh Cavalry, on trip to: 671–701.
SCHMERKER, A. A. B., secretary-treasurer, board of pharmaceutical examiners:
Report of: 274.
SCHOOLS:
Sanitary inspection of: 181.
System in Moro Province: 581–583.
(See also EDUCATION.)
SCOTT, HUGH L., MAJ., Fourteenth Cavalry, governor, district of Sulu, Moro Province:
Mentioned: 572, 594.
SEED:
Distribution of: 509–510, 520.
Varieties: 510.
SEED AND PLANT INTRODUCTION:
Progress of work of: 492, 493.
SERUM:
Amount prepared: 57.
SHARP, G. W. C., treasurer, district of Davao, Moro Province:
Mentioned: 573, 594.
SHEEP:
Raising of: 74, 504.
SILVER:
Analyses of: 446.
Claims, number of: 394.
Deposits of: 401.
SINGALONG EXPERIMENT STATION, MANILA:
Acreage of: 66.
Equipment: 67.
Products raised: 66, 67.
Forage crops: 66.
Sorghum and Kafir corn: 66.
Soy beans: 67.

SINGALONG EXPERIMENT STATION, MANILA—Continued.
Products raised—Continued.
Sulla: 67.
Velvet beans: 67.
Management of: 489, 490.
SLAVERY. (See MORO PROVINCE.)
SLEE, JOHN G., chief veterinary division:
Report of: 169, 170.
SMALLPOX:
Cases in Manila: 10, 95, 165.
Deaths: 10, 95.
Vessels disinfected: 23.
SOIL PHYSICIST:
Report on soil and agricultural conditions: 521–531.
Baguio and Benguet: 521–528.
Crops grown and methods of cultivation in use: 527–529.
Camote: 527.
Coffee: 527.
Potato: 527.
Rice: 527.
Tobacco: 528.
Harvesting and curing: 529.
Yield: 529.
General physiography: 521.
Soils: 522–526.
Chemical analyses: 525.
Mechanical analyses: 522–524.
Methods of: 523.
Water, soluble contents of: 525–526.
Cagayan Valley, Luzon, investigations in: 527–531.
Methods of cultivation in use: 528.
Soils: 529–531.
Character of: 529–530.
Chemical analyses: 530.
Mechanical analyses: 530.
Water, soluble contents of: 531.
Worming: 529.
SORGHUM:
Cultivation and prices of: 490, 491.
SPANISH LAND GRANTS:
Transfer of administration of: 59.
SPANISH LAND TITLES:
Records of: 59, 475.
Fees for: 475.
SPANIARDS:
Births, number of: 5.
Death rate: 5.
SPEED, JOHN G.:
Mentioned: 63.
SPRINGER, JOHN E., PROVINCIAL ATTORNEY, MORO PROVINCE:
Mentioned: 572, 594.
STAFFORD, H. EUGENE, attending physician and surgeon, Civil Hospital:
Report of: 302–307.
Mentioned: 136.
STAMP MILL:
Erection and operation of: 40.
STANSFIELD, H. A., assistant surgeon:
Mentioned: 22.
STANTON, REV. WILLIAM A., S. J., assistant director, Philippine weather bureau:
Visits to various stations: 547.
STEAM PLOW:
Benefits from use of: 497, 498.
STEAMSHIPS:
subsidizing of, recommended: 593.
STOCK FARM, GOVERNMENT:
Animals shipped to: 65, 488, 489.

STOCK FARM, GOVERNMENT—Continued.
Establishment of: 9.
Report of manager of: 505–508.
Breeding cattle: 506.
Buildings: 505.
Experimental work: 507–508.
Native labor: 507.
Stock: 505.
Water supply: 506.
STONE:
Claims, number of: 394.
STRONG, RICHARD P., director biological laboratory:
Mentioned: 50.
Report on cholera cases: 111–113.
Report of: 435–444.
SUGAR CANE:
Cultivation and production of: 72, 500, 501, 516.
SUGAR MILLS:
Need of: 516.
SUGAR REFINERY:
Establishment of: 72.
SULPHUR:
Deposits of: 403.
SURIGAO, PROVINCE OF:
Health, board of, report of president: 264–266.
Cholera: 264, 265.
Smallpox: 265.
Vaccinations: 266.
Sanitary inspections, report of: 261–264.
Cholera, history of epidemic: 263.
Customs and habits of the people: 264.
Death rate: 262.
Cause: 262.
Diseases among domestic animals: 262.
Diseases common: 262.
Hospital sites: 264.
Hygiene and sanitary condition of towns: 262.
Municipal boards of health: 262.
Provincial board of health: 261.
Smallpox: 263.
Work accomplished: 262.
SURRA:
Clinical notes by Thomas M. Owen, veterinarian: 215–216.
Prevention: 216.
Modes of transmission: 216.
Mortality: 215–216.
Symptoms: 215.
Treatment: 216.
Cure for, not found: 4.
Observations and treatment of: 48, 416, 417, 451, 455, 458–459.
Ravages of: 4.
SWINE PLAGUE AND HOG CHOLERA:
Report by Murray J. Myers, D. V. M.—
Cause: 210.
Diagnosis: 211.
History: 210.
Introduction: 210.
Post-mortem lesions: 211.
Symptoms: 210.
Treatment: 211–212.
TAN BARK:
Quantity taken from public lands: 372.
TANNING AND LEATHER ESTABLISHMENTS:
Establishment of: 503.
TARLAC, PROVINCE OF:
Sanitary inspections, report of: 249–251.

TARLAC, PROVINCE OF—Continued.
Sanitary inspection, report of—Continued.
Cholera: 250, 251.
Introduction: 250.
Measures adopted: 250.
Number of cases: 251.
Municipalities: 249, 250.
TEOSINTE:
Cultivation and price of: 490, 491.
TERRY, DR. M. C., medical inspector:
Report of special sanitary inspection in provinces of Pampanga, Tarlac, Pangasinan, Benguet, and Union: 248–259.
TEXAS FEVER (TICK FEVER, SPANISH FEVER):
Report by Murray J. Myers—
Cause: 213.
Course and termination: 214.
Diagnosis: 214.
History: 212.
Post-mortem lesions: 214.
Preventions: 215.
Symptoms: 214.
Treatment: 215.
THANISCH, F. A.:
Mentioned: 52.
THOMPSON, FRED. A., treasurer, Moro Province:
Appointment: 572, 594.
TIMBER:
Amount cut: 340.
Price of: 335.
Imports into Philippine Islands: 373.
Licenses issued for cutting of: 339, 340.
Prices of: 374, 378.
Quantity taken from public lands: 372.
TIMBER-TESTING LABORATORY AND WORKSHOP:
Report of: 360–370.
Borneo woods, tests of: 368–370.
Machinery: 360–361.
Table of results obtained: 362–370.
TIN:
Deposits of: 401.
TIPTON, WILL M., chief of bureau of public lands:
Report of: 468–479.
TOBACCO:
Cultivation: 520.
Reduction duty in Moro Province recommended: 591.
TREES:
Fruit, imported: 359.
Native: 359.
Imported ornamental: 358.
Timber, imported: 357.
Native: 357.
TRINIDAD AND BAGUIO EXPERIMENT STATION:
Crops, cultivation of: 494.
Prospects of: 494, 495.
Soil conditions: 494.
TURKEYS. (See FOWLS.)
UBAGO, G. M. DE:
Mentioned: 385.
UNION, LA, PROVINCE OF:
Sanitary inspections, report of: 255–256.
Cholera: 256.
Diseases among animals: 258.
Diseases, deaths from: 256.
Municipalities: 255.
Smallpox, deaths from: 256.

VACCINATION:
Circular governing: 96–110.
Certificate of performance of vaccination: 99.
Certificate of successful vaccination: 100.
Certificates of vaccination by physicians: 98.
Inspections, records: 99.
Methods of vaccination: 97.
Office and clerical work: 98.
Persons to be vaccinated: 98.
Reports: 99, 100.
Supervising vaccinator, duties of: 96.
Vaccine virus: 98.
Vaccinators, assignment of: 96.
Courtesy by employees: 97.
Enforcement of vaccination: 97.
Hours of duty: 97.
Instructions for: 97.
Uniform and appearance: 97.
Work required: 97.
(See also VACCINATION, PROVINCIAL.)
Difficulties encountered: 101.
Number in Manila: 10, 95, 96, 164.
Number of: 173.
Opposition to: 11.
Organization of service: 173.
Plans for: 10, 96.
Provincial: 101–109.
Circular of instructions for conduct of: 101–110.
Virus sent to provinces: 101.
VACCINE VIRUS:
Amount prepared and distributed: 454, 460, 466.
Distribution to provinces: 162–164.
Number of units used: 10.
Preparation of: 49, 416, 453, 459.
Animals used in: 454, 460.
Transportation of: 10.
VAN HORN, ROBERT O., captain, Seventeenth Infantry, governor, district of Cotabato, Moro Province:
Mentioned: 573, 594.
VETERINARIAN, CHIEF:
Report of: 204–207.
Animals—
Condemned: 170, 206.
Inoculated against rinderpest: 207.
Inspected: 150, 206.
Slaughtered and condemned in matadero: 169, 207.
Treated: 205.
Duties of: 204–205.
Organization: 204.
Personnel: 205.
VETERINARIANS:
Reports on—
Anthrax—
Preliminary report on presence of, in Philippine Islands, by R. H. McMullen, veterinarian—
Biological properties of bacilli: 208.
Spores: 208.
Cause: 208.
Diagnosis: 209.
Distribution and source of infection: 208.
History of disease: 207–208.
Morbid anatomy and pathology: 209.
Prevention: 209–210.
Symptoms: 209.
Treatment: 209.

ETERINARIANS—Continued.
Report of—Continued.
Surra—
Clinical notes by Thomas M. Owen, veterinarian: 215–216.
Prevention: 216.
Modes of transmission: 216.
Mortality: 215–216.
Symptoms: 215.
Treatment: 216.
Swine plague and hog cholera—
Report by Murray J. Myers, D. V. M.—
Cause: 210.
Diagnosis: 211.
History: 210.
Introduction: 210.
Post-mortem lesions: 211.
Symptoms: 210.
Treatment: 211–212.
Texas fever (tick fever. Spanish fever)—
Report by Murray J. Myers, D. V. M.—
Cause: 213.
Course and termination: 214.
Diagnosis: 214.
History: 212.
Post-mortem lesions: 214.
Preventions: 215.
Symptoms: 214.
Treatment: 215.
ETERINARY DIVISION:
Animals examined: 20.
Force, increase of: 20.
Report of chief of: 169, 170.
OLCANOES AND EARTHQUAKES OF THE PHILIPPINES:
Preparation of paper on: 546.
/AX, CHARLES H.:
Mentioned: 562.
'EATHER BUREAU:
Astronomical department, services rendered by: 545.
Barocyclonometer, publication of paper on: 543.
Cyclones of the Far East, publication of: 543.
Director, absence of: 74.
Exhibit at Louisiana Purchase Exposition: 76, 542–559.
Arch for the microseismograph: 554.
Correspondence with chief of the Bureau of Insular Affairs: 558–559.
Description of station: 554–557.
Correspondence with Census Bureau: 557–558.
Geographical section: 554.
Meteorological section: 555–557.
Seismic section: 555.
Opening of fair: 558.
Opening of Philippine exhibit: 560.
Preliminary work on: 551, 552.
Preparation of large relief map: 552–553.
Magnetic department, work of: 546.
Maps prepared: 76.
Meteorological observations: 542.
Meteorological station at Guam: 76.
Monthly bulletin, publication of: 543.
Observations, arrangements for: 542.
Office improvements: 75.
Publications of: 543.
Quarters, improvement in: 544.
Report of the Director of: 542, 560.
Secondary stations, work of: 547, 548.
Seismic section, work of: 545, 546.
Seismological Congress, participation in: 545.
Services rendered by: 544.

WEATHER BUREAU—Continued.
Weather dispatches, instructions for sending, from Guam Island: 549–551.
Weather stations: 76
WELBORN, W. C., chief, bureau of agriculture:
Appointment: 61.
Report of: 480–540.
WIGMORE, LIEUT. H. L., U. S. A.:
Mentioned: 41.
WILKINSON, DR. H. B., physician in charge San Lazaro Hospital:
Report of: 188–195.
Report inspection of province of Albay: 219.
WILLIAMS, DR. JAMES R., medical inspector:
Death of: 187.
WILLIAMS, R. S., collector, New York Botanical Gardens:
Notes on Lamao Forest Reserve, Lamao, Bataan Province: 353–356.
WOOD, LEONARD, Maj. Gen., U. S. A., governor Moro Province:
Report of: 572–701.
WOODS:
Results of tests of: 360–370.
WOOL:
Production of: 74, 504.
WOOLLEY, DR. PAUL G.:
Mentioned: 416, 417.
WORCESTER, DEAN C., secretary of the interior:
Report of: 3–81.
YELLOW FEVER:
Dangers of infection from Panama: 7, 92.
ZAMORA, M., member board of pharmaceutical examiners:
Report of: 274.
ZAMBALES, PROVINCE OF:
Sanitary inspections, report of: 266–269.
Cholera epidemic: 269.
Customs and habits of people: 269.
Municipal boards of health: 267–269.
Provincial board of health: 266.
ZINC:
Deposits of: 401.



